# THE

# WEEKLY VISITOR,

## FOR 1835.

THE WORKS OF THE LORD ARE GREAT, SOUGHT OUT OF ALL THEM THAT HAVE PLEASURE THEREIN. HIS WORK IS HONOURABLE AND GLORIOUS: AND HIS RIGHTEOUSNESS ENDURETH FOR EVER. HE HATH MADE HIS WONDERFUL WORKS TO BE REMEMBERED THE LORD IS GRACIOUS, AND FULL OF COMPASSION.—PSALM CXI. 2—4.

WHATSOEVER THINGS ARE TRUE, WHATSOEVER THINGS ARE HONEST, WHATSOEVER THINGS ARE JUST, WHATSOEVER THINGS ARE PURE, WHATSOEVER THINGS ARE LOVELY, WHATSOEVER THINGS ARE OF GOOD REPORT; IF THERE BE ANY VIRTUE, AND IF THERE BE ANY PRAISE, THINK ON THESE THINGS.—PHILIPPIANS IV. 8.

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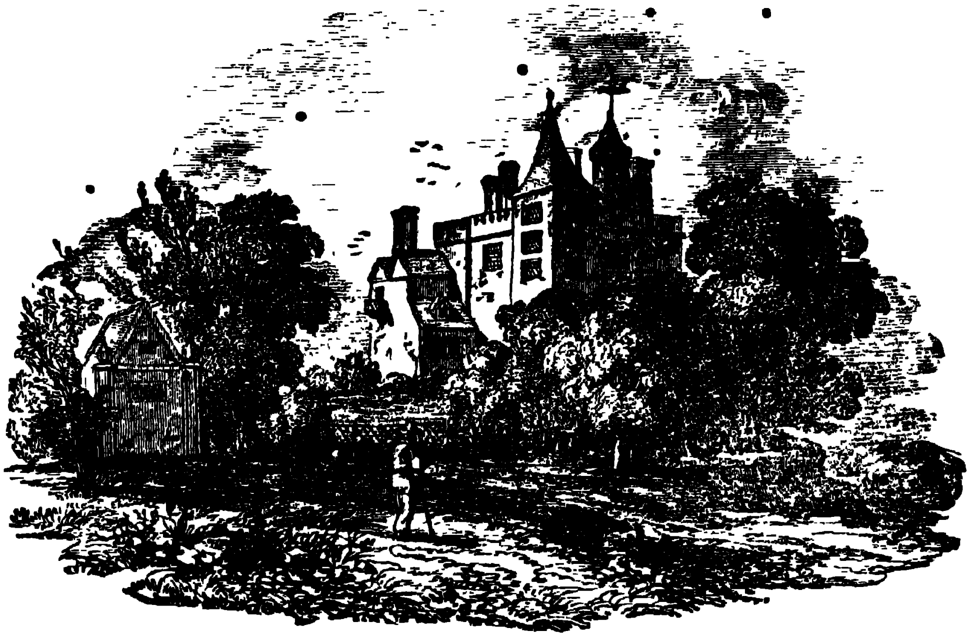
# THE WEEKLY VISITOR.

NUMBER CXXI.] TUESDAY, JANUARY 6, 1835. {PRICE ONE HALFPENNY.



## GREENWICH CASTLE, KENT.

THE above engraving represents Greenwich Castle, which formerly occupied the site of the present Royal Observatory, commonly known as Flamstead House; for the erection of which, this castle was taken down in the year 1675.

Greenwich appears to have been a royal residence so early as the time of Edward I., and long continued a favourite retreat of royalty. It was the birth-place of King Henry VIII., Queen Mary, and Elizabeth; and here the youthful monarch, Edward VI., breathed his last. After the restoration of Charles II., the old palace was found to be in a very dilapidated state, arising partly from time, and neglect in making the necessary repairs during the civil wars and the commonwealth. It was taken down, and a new one upon a magnificent scale commenced from the designs of Webb, the son-in-law of Inigo Jones. Part of it was erected, (forming with additions the west wing of the present hospital,) in which the king occasionally resided, but no farther progress was made towards its completion until the time of William and Mary, when it was converted to its present use, as an hospital for the reception and comfortable maintenance of decayed seamen of the royal navy.

Early in the fifteenth century, the manor of Greenwich was granted to Humphrey Duke of Gloucester, by his kinsman King Henry V.; and in 1434, the duke enclosed and ornamentally planted some land, consisting of about two hundred acres, now called Greenwich Park. Also on the most elevated point of the park he erected a tower for his occasional residence, called Greenwich Castle, which is represented in our engraving.

Greenwich Castle appears to have been variously employed, sometimes as a place of defence, sometimes as a residence for the younger branches of the royal family, and at others a kind of state prison. Mary, one of the daughters of Edward IV., as also Elizabeth, Countess of Suffolk, died here; the former in 1482, and the latter in 1633. It was the occasional residence of Henry Howard, Earl of Northampton, in the reign of James I., and the prison of the Earl of Leicester, in the reign of Queen Elizabeth. Likewise, in the disputes between King Charles I. and his parliament it was used as a place of defence.

The castle appears to have been occasionally employed as a banquetting house, especially during the period when Blackheath was the scene of the tournaments, and Greenwich palace of the grand festivals given by King Henry VIII.

In the foreground of the very curious old print, from whence our engraving was copied, two ladies are represented, one of whom is masked, and they appear to be approaching the castle to join in the festivities of the place.

At the left hand corner of the print are the following lines:—

> "Behould by Prospect, with what Art
> Fayre Greenwich Castle Pleasantly.
> A House of Banquet, neare and part
> Of Thames and London, How they ly."

It is to be regretted that there is no date to this print; but the address of the publisher is as follows:—

"London. Printed and sould by Peter Stent at the Crowne in Giltspur-street betwixt New Gate and Pie Corner."

Greenwich Castle was removed, at the suggestion of Sir Christopher Wren, in the year 1675, for the erection of the present building, the Royal Observatory, which it is our intention to describe in future numbers.

◆

## SHOES.

And is winter really come again? sharp, frosty, bleak-blowing winter! Yes, indeed, it is true. More than three hundred and sixty-five times has the earth turned on its axis, in its journeyings round the sun, since the *Weekly Visitor*, pleading the cause of the poor, urged those who abounded in earthly comforts to give a blanket to the destitute and shivering being who knew not the luxury of a warm and comfortable bed. And now, again, when the raw, keen air, the descending snow, the sudden thaw, the wet slippery sloppy pathway, await the sons and daughters of poverty and affliction, the *Weekly Visitor* again raises its voice on behalf of the needy and destitute.

Perhaps, reader, the chapter on "Blankets," last year, did not reach your eyes, or possibly, did not influence your heart; in either case let the present appeal melt your breast

> "To do some gentle deed of charity."

But suppose you did give a blanket last year to some one who wanted it, thereby expending a few shillings in the luxury of doing good—have you slept the less warm for it, or been made poorer by the deed? You know that you have not; and, most likely, since then you have expended ten times the amount in indulgences which yield not half the gratification that a deed of benevolence produces.

Think not that your gift of last year should withhold your hand from bestowing in the present one. O no! God in his mercy has not kept back his bounty from you; neither should you withhold your hand from doing good. Strengthen then the weak, bind up the bruised, encourage the broken-hearted, relieve the poor, and give a pair of shoes to some poverty-stricken being who cannot afford to buy them.

If, accustomed to be well shod during the winter, you have a good stock of shoes and boots to defend your feet from the searching influence of the dissolving snow, you can hardly imagine what is endured by those who have wet feet from morning to night. Many a hapless fellow-creature, brought up with care, and watched over with tenderness, is reduced so low, that the possession of a good pair of shoes would be considered a luxury, a positive blessing. Think of your own comforts, and of others' deprivations, and shut not up your heart to the wants of the destitute, but give a pair of shoes, or something towards enabling some poor creature who stands in need of them, to obtain such a comfort.

Read the words of scripture, "Whoso hath this world's good, and seeth his brother have need, and shutteth up his bowels of compassion from him, how dwelleth the love of God in him?" and then say, can any one go guiltlessly through the world, treading on comfortable carpets within doors, and well defended from inclemency without, while he sees, and attempts not to relieve the misery and wretchedness of those who suffer from the want of shoes?

How many hours of discomfort, how many days of affliction, yea, how many years of disease and pain have been brought on by persons getting wet in their feet! and will you let those who have fireless habitations, and blanketless beds, go almost shoeless through their plashy pathways, while perhaps lambswool stockings and strong well-made boots defend your feet from the least inconvenience? If you have humanity, you will not, and if you have christian charity, you cannot refuse your aid; but, as you have ability and opportunity, you will "do good unto all men, especially to those who are of the household of faith."

If your eye be quick to discern, and your heart prompt to feel the distresses of others, you will not long lack opportunities to relieve them. Look around at the throngs that continually crowd the populous city or town; regard not only their faces, but their feet; not only their clothes, but their shoes also, and you will be surprised at the wretched shifts to which many of them are driven. It is enough to make the heart ache to see the miserable plight in which hundreds pursue their daily calling. Here is a ragged lad dragging through the miry street, with a pair of old shoes big enough for his father. There is a poor girl, who has contrived to tie on her feet with packstring, another pair, already worn out by her mother; and yonder is a barelegged and barefooted being, between whose defenceless toes the mud oozes as he paddles onward through the descending rain.

Look towards the chandler's shop at the corner. Mark that meagre and tattered mother, with a child in her arms, wending her way there for a rushlight, paddling through the snowy puddle, with an old pair of thin-soled shoes on her feet, which cost only one and ninepence when they were new. Do not talk about her imprudence, and her improvidence; who is there in this wide world that has not been imprudent and improvident? David, perhaps, you will admit, was as faithful a servant of God as you are, and he says, "If thou, Lord, shouldst mark iniquities, O Lord, who shall stand?" Does it become us, then, to be severe, in such an inclement season, on our fellow-sinners, when we have been visited with unmerited mercy? Cast another glance at the poor wretch, as she stoops to adjust her brown paper sock, and to pull up the trodden down heel of her saturated shoe, and say whether the heart is to be envied that does not yearn to lessen her wretchedness, and to increase her comforts? You may not know whether she has always acted with discretion but you do know that she is walking in a miserable puddle, and that she has a wretched pair of shoes on her feet.

Neither must you say that this picture is overdrawn; on the contrary, it is "faithful to a fault," it is sketched from the life; it is unmingled, unembellished truth, which you have only to look for to behold.

These are sights which every one may see, and trials that every one, possessing the ability, ought to endeavour to remove; but we are too apt, in such cases, to call upon others to act, and to excuse ourselves. We can cry loud enough,

> "Take physic, Pomp,
> Expose thyself to feel what wretches feel,"

with affected virtuous indignation against hardheartedness, and yet be content to remain inactive; like the pharisees of times gone by, who bound heavy burdens on men's shoulders, while they themselves moved them not with one of their fingers.

If, selfishly regardless of others' wants, we are liberally providing for our own comforts; if, casting aside shoes but half-worn out, which so many people would thankfully receive, we are ordering new ones, to gratify our pride, we deserve, indeed, to be visited with calamity. Wonderfully quick-sighted is a lame man in observing all who walk on crutches; benevolently susceptible are we, after a fit of the tooth-ache, to the pains of all visited with a like calamity; and were we compelled, for a single day, to wade through the miry streets without shoes, or with such only on our feet as freely let in the water, such an appeal as the present would be useless, for gladly should we contribute to the removal of trials which now, perhaps, we pass without pity.

To a poor person, a strong, well-made pair of shoes is at all times a valuable present, but doubly so in the inclement season of winter. Be persuaded, then, to assist some one, whom you think worthy of your kindness, in attaining so desirable a benefit. Give not to those who frequent the pawnbroker's and gin-shop, for though you may deplore their misery, you cannot relieve it. Your bounty would only afford them a short-lived and guilty respite from their increasing cares. Give to those, who are struggling hard to procure comforts, which, when attained, will be highly valued, and carefully preserved; and when the snows are abroad, and the rains descend, when the wintry winds whistle around your cheerful habitation, you will not regret having contributed to the comforts of the destitute. All the kindly feelings you may indulge in towards the poor, are not equal to the gift of a single pair of shoes: but while I mention this gift in particular, I would exhort to all deeds of kindness. "Blessed is he that considereth the poor: the Lord will deliver him in time of trouble."

G. M.

## BOTANY. No. I.

### INTRODUCTION.

In the 12th verse of the first chapter of Genesis, the Hebrew original informs us that the earth brought forth the sprouting herbage of each plant, seeding seed after its kind, which the Septuagint renders by saying that the earth produced the herbage of a plant, sowing seed after its genus and after its affinity. To divide plants into genera by fixing upon some characteristic mark of distinction, and to collect these genera in groups or orders according to their affinity, or, in plainer terms, their points of mutual resemblance, are the principal objects and business of a systematic botanist. The characteristic marks in question must be sought for in the seed, or in those parts which immediately minister to its production. These parts, taken together, are known under the general denomination of a flower, but in various instances, as in the case of mosses, lichens, sea-weed, &c., though they are subservient to the defence and preservation of the seed, yet they have not the most distant similitude in appearance to the divisions of a blossom. It is an established maxim of botany, invariably followed by those who have and are contributing to enlarge the boundaries of this science, that the tokens of discrimination are to be looked for among the organs which provide a lodgement and decoration for the seed, whether they be accessible to the unassisted eye, or whether the aid of a magnifier is necessary for their investigation.

While the student of vegetable nature continued to look for primary notes of distinction between one plant and another in the stem or leaves, the history of plants was merely a collection of unconnected statements. But when botanists began to study them in reference to their fructification, or mode of bearing seed or fruit, what had once been little more than a disjointed narration of facts, soon assumed those symptoms of connexion and regularity which belong to a science. There was not merely knowledge of things, but the method of acquiring fresh knowledge, and of delivering it to others. Before the invention of any system, when we had found a plant, with the name and properties of which we wished to be made acquainted, we might open a portly folio, with the happy peradventure, that we might be obliged to read the volume quite through, before we met with a description of the plant which we held in our hand. But now, after examining a plant, we soon discover some circumstance in the structure of its flower or fruit, which leads us to look for it in some corner or division of a natural order, and the description of it is presently found.

The science may appear intricate and abstruse at first, but the pains taken at the beginning, have the twofold advantage of saving us from disappointed toil afterwards, and of giving quickness to the eye by directing the judgment. Those are not to be listened to who would check the career of improvement, either by displaying the difficulties of new systems, or by antiquated encomiums upon those that are old. In the *Weekly Visitor* we propose briefly to state the leading characters of an order or family of plants; to describe the principal genera, or members, of that family; and to endeavour, with all the variety of illustration our limits will permit, to give the student a perspicuous idea of an order. The objects of study shall be such as are generally within reach, and will either be familiar to the reader, or be pointed out to him by such characters that he cannot fail to recognise them. He must not expect entertainment in the bare reading of technical characters, he must seek for that in examining recent specimens. It will be our business to point out the road to a genuine acquaintance with the organization, the peculiarities of form, and the connecting links of resemblance which obtain among vegetables; and by explaining each term just before we use it, to save the reader the uninteresting toil of an elementary course of preparation.

All the wisdom which created beings possess, apart from that which is made known to them by express revelation from God, is derived from a contemplation of the works of the Almighty Creator. The rudiments and first beginnings of the various arts which contribute to the sustenance and adornment of life, had no other original than those lessons which men learn from the observations of the laws and productions of created nature. To say, therefore, that botany is the study of a certain department of God's creation, is to pronounce its highest recommendation; for we know, all that is useful, and all that is lovely, proceed from this Fountain, and cannot be made the agent of evil, but by a sinful abuse of them, and by a perverse thwarting of their original tendency. The investigations which this science invites us to are peculiarly fitted to meet and contend with that spirit of unbelief which is more or less arising in our depraved hearts. We are too apt to think that we are altogether too inconsiderable for God, amidst the infinitude of his works, to feel a special interest in our welfare; that he is too highly exalted to take pleasure in our love and duty, or to be offended at our disobedience. But Wisdom, addressing us from her seat amidst the objects of vegetable nature, tells us how unlike to the image which unbelief draws of the Deity, is that portraiture set before us in every little plant that enlivens the solitary and waste places of the earth. Each one of them bears its individual and appropriate testimony to the infinite length and breadth of that kind and gracious care which is extended over all the works of God. Provision is not only made for its growth, and the increase of its kind, but a certain measure and allotment of beauty is bestowed upon it, not detected perhaps by the common observer, but recognised and understood by the experienced eye of a botanist. In this study, as well as in all the Divine dispensations, "The works of the Lord are great, sought out of all them that have pleasure therein." Psa. cxi. 2.

Botany we shall define to be that science which directs the intellectual faculties to discern, to account for, and to appreciate, that order, symmetry, and grace, which our beneficent Creator has displayed in his vegetable kingdom of nature. When our minds are rightly affected, the pursuits and researches to which this science prompts, have a tendency to produce the reflection, that if God hath not considered it beneath the dignity of his character to impress such things as little flowers, and what some call "dull incurious weeds," with marks of wisdom, goodness, and care, it cannot be inconsistent with the exalted nature of his attributes, to make the interests and concerns of man the matters of his cognizance, the subjects of his most intimate and gracious regard.

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### REST NOT IN HEARING ONLY.*

In many ways, in public and in private, you may have heard much of God by the hearing of the ear. Grievously as God is forgotten in the world, much as many called christians are ashamed of Jesus Christ, especially of his cross and of all the peculiar doctrines of his gospel, yet I am not obliged to suppose, that worldly-minded persons never hear any thing of God by the hearing of the ear. On the contrary, they may hear much. They may hear lesson after lesson out of God's word; they may hear ministers set forth the character of God as revealed in scripture: they may go farther; they may gain a correct theoretic knowledge of the only plan of salvation, so as to be able to talk of it fluently, and to argue for it vehemently; and yet, they may never have felt the power of the divine word, been humbled by it in heart, and been brought to repent truly before God. Religion may be with them the business of the ear which hears, and of the tongue which talks,—not yet of the heart which feels, and of the soul which falls prostrate in self-abasement before the God who gave it.

My brethren, examine your own selves. Let each think, Has all my religion and knowledge of God been but the hearing of the ear? Have I, like the Samaritans, been worshipping I know not what? like the Athenians, been building an altar to the unknown God? Have I talked of repentance, yet never repented? of faith, yet never believed? of good works, yet never performed one work from the only motives which God approves as good? If so, surely something, yea, much more is still needful to my soul.—*Hambleton.*

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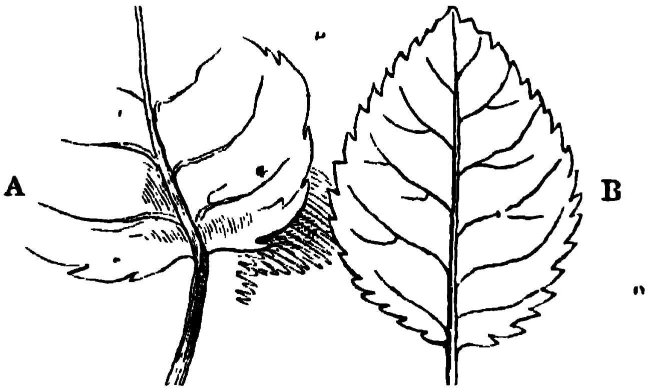
### SIMPLICITY.

All the works of God are admirable, whether we consider them in reference to the wisdom of their contrivance, or the beneficence displayed in their ends. But notwithstanding the wisdom and benignity which meets us, and excites our wonder at every step we advance in the kingdoms of nature or of grace, there is nothing more remarkable than the simplicity of the means by which God is pleased to accomplish his purposes. Examples of the simplicity of wisdom are ever at hand. The exhalations and clouds, which water and refresh the earth, rise and descend through the agency of heat alone. All the winds, from the gentle zephyr that plays upon the water at eventide, to the hurricane that uproots the sturdiest trees, and sweeps away the laboured monuments of man, are produced by one and the same cause, heat.

Even that singular phenomenon, the water-spout, may be ascribed in some measure, if not altogether, to some modification in the agency of heat; for it is sometimes attended with an extraordinary depression of temperature, as the writer once experienced in the southern Pacific. To turn our eyes from the sublimer objects of nature to those that seem less assuming, we see the honey-suckle twining round the neighbouring shrubs, simply through the action of heat upon the sides exposed to its influence, just as a sheet of paper bends when held to the fire.

As one of the most familiar instances of simplicity of contrivance, we might cite the aspen. Had it been proposed as a problem, to find what should be the nature of a leaf that would quiver in the lightest possible agitation of the air, it could not have been more clearly solved than by the mere inspection of the leaf and its leaf-stalk.

If the aspen leaf A were held up in the hand so that its edges pointed north and south, the edges of the stalk would point east and west; but in B, the leaf of the elm, *both* the leaf and the stalk would point in the same direction; or, as commonly explained, the plane or level of the leaf is exactly perpendicular to the plane of the footstalk.



These instances, with a countless multitude of others which might be drawn from all quarters of creation, suggest to us the wisdom and propriety of making simplicity the reigning principle of our lives. Our plans should be simple; the means selected for carrying them into execution simple; the whole bent and tenour of our conduct in prosecuting them simple. The student in literature or science will find that his proficiency is comprehensive and well founded, in proportion to the simplicity of the methods pursued. The christian whose heart is longing for a solution of some difficulties, or a right apprehension of things hard to be understood, will find them in patient and simple study of the word of God: and the man who desires to be saved from the punishment of hell, and inherit the kingdom of heaven, must cast away the complexities of all other systems, and rely alone on the simplicity which there is in Christ. Happy the hearts that "in simplicity and godly sincerity, by the grace of God, have their conversation in the world." 2 Cor. i. 12.

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## INSECTS.—No. XXX.

*(Remarkable Showers.)*

It is remarkable that when insects pass from the pupa state and become perfect, they always discharge some substance. In the case of several moths, it is whitish, or of an orange colour; while in that of many butterflies, where their numbers have been considerable, the appearance of a shower of blood has been produced; and by this fact, those bloody showers, recorded by historians as preternatural, and considered where they happened as fearful prognostics of impending evils, are stripped of their terrors, and reduced to the class of events which happen in the common course of nature. That insects are the cause of these showers is, indeed, no recent discovery; for it is stated by Sleidan, that in the year 1553, a vast multitude of butterflies swarmed through a great part of Germany, and sprinkled plants, leaves, buildings, clothes, and men, with bloody drops, as if it had rained blood. But the most interesting account of an event of this kind is given by Reaumur, from whom we learn, that in the beginning of July, 1608, the suburbs of Aix, and a considerable extent of country round it, were covered with what appeared to be a shower of blood. We may conceive the amazement of the populace at such a discovery, the alarm of the citizens, and the grave reasonings of the learned. All agreed, however, in attributing this appearance to the powers of darkness, and in regarding it as the precursor of some tremendous calamity. On this occasion, fear and prejudice would have taken deep root, and they might have produced fatal effects on some weak minds, had not M. Peirese, a celebrated philosopher of that place, paid attention to insects. A chrysalis, preserved in his cabinet, explained to him the cause of this mysterious shower; for, hearing a fluttering, which apprized him that the creature had arrived at its perfect state, he opened the box in which it was kept, when the insect flew out, leaving behind it a red spot; and on comparing it with the spots of the bloody shower, he found they were alike. At the same time he observed there was a prodigious quantity of butterflies flying about, and the drops of the miraculous rain, as it was supposed, were not to be found on the tiles, nor even on the upper surface of the stones, but chiefly in cavities, and places where rain could not easily come. Thus did this enlightened and judicious observer dispel the ignorant fears and terrors which had been caused by a natural phenomenon.

It may be well to show that a similar effect has been produced in other cases. A gardener was once thrown into great consternation by digging up what he conceived to be the effect of witchcraft, portending some terrible misfortune. By the advice of the parish priest, he even took a journey from Rouen to Paris, to show what he had found to his master; but he, happily, was wiser than his man, and proceeded with him to an eminent naturalist. He pronounced the objects which had excited so much alarm, the curious cases of the leaf-cutter bees; and while the gardener stood aghast at his temerity, pointed out the grubs they contained, and thus sent him back with a light heart, relieved from his ignorant apprehensions. These need not, however, excite our wonder, when it has been gravely affirmed that every oak-gall contains either a fly, a spider, or a worm, and that the first foretells war, the second pestilence, and the third famine! In Sweden, the peasants consider the grub of the cockchafer as furnishing an unfailing prognostic, whether the ensuing winter will be mild or severe. If the animal have a bluish hue, they affirm it will be mild; but, on the contrary, if it be white, the weather will be severe; and so far do they carry this as to foretell, that if the anterior part be white, and the posterior blue, the cold will be most severe at the beginning of the winter. A little knowledge would show them, that this circumstance of the creature having a bluish hue, arises from its being replete with food. Every one has heard of what is called "the death-watch," and of the superstitious notion, that in whatever house its drum is heard, one of the family will die before the end of the year. These terrors, in particular instances, where they lay hold of weak minds, especially of sick or hypochondriac persons, may actually cause the event which is supposed to be prognosticated. And yet how easily might they be told that their fears were vain, and that this heart-sickening tick is caused by a small beetle which lives in timber, and is merely a call to its companion!

In closing this paper on the red showers produced by insects, we are reminded of the crimson snow of the Alpine and Arctic regions, which has recently excited so much inquiry. Some have thought it of vegetable origin, and others, that it stands as a distinct genus on the very limits of the animal and vegetable kingdoms. Baron Wrangel mentions that a substance growing on limestone rocks was easily detached when placed under water, and that in three days it was converted into animated globules, like infusory animalcules, which swarm about, and were preyed upon by other infusoria. It is, however, conjectured by the Rev. W. Scoresby, that the red colour of the snow may be traced to the same cause as the orange-coloured ice of the polar seas, which arises from innumerable minute animals, similar to the Bervë globulosa of Lamarck. It is about the size of a pin's head, transparent, and marked with twelve brownish patches of dots. In olive-green sea water, he estimated 110,592 of these in a cubic foot.

A singular analogy to the case first stated is mentioned by Mr. Thomas Nicholson, who, with two other gentlemen, made an excursion, in 1821, to Sowallick Point, near Bushman's Island, in Prince Regent's Bay. "The summit of the hill," he says, "forming the point, is covered with huge masses of granite, whilst the side, which forms a gentle declivity towards the bay, was covered with crimson snow. It was evident, at first view, that this colour was imparted to the snow by a substance lying on the surface. This substance lay scattered here and there in small masses, bearing some resemblance to powdered cochineal, surrounded by a lighter shade, which was produced by the colouring matter being partly dissolved and diffused by the melting snow. During this examination, our hats and upper garments were observed to be daubed with a substance of a similar red colour, and a moment's reflection convinced us that this was discharged by the little insects, myriads of which were continually flying over our heads, having their nests among the loose masses of granite."

To these insects Mr. Nicholson therefore attributes the red snow; but though he accounts for the phenomenon in the place he visited, to what is it to be ascribed where this little insect is not known? This is a question, which, like many others, we must wait to have answered.

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## THE CHEQUERS.

We have often inquired, in times past, the reason and meaning of the little party-coloured squares upon the door-posts of "mine hostess," but were never indulged with an explanation. It has happened to this practice as to many other traditions, men adopt them as a part of the patrimony which their forefathers have left them, without ever knowing why, or caring wherefore. The reader will easily apprehend its intent, however, when we say that it is the representation or picture of a board which was used by retail dealers, in early times, for the convenience of reckoning up their monies at night. We will suppose, for the sake of exemplification, that upon a red square, guineas were placed; upon an orange one, half-guineas; upon a yellow one, crowns; and so onward in a descending series, through the seven prismatic colours of the rainbow; it is easy to see that the business of counting would be rendered more easy and less liable to mistake by this contrivance. There seems to be no mystery involved in the matter, but what is unfolded in this short illustration. After the lapse of a little time, the chequered board became the emblem of calculation; as we see, for instance, in the cloth upon the large table in the Court of the Exchequer, which takes cognizance of all matters relating to the revenue. The cloth seems to indicate that the questions argued there are chiefly concerned in the reckonings of money. It was afterwards used as a sign of an inn, or hostlery, where victuals were sold, or strangers lodged and entertained; where, in plainness, goods and accommodation were exchanged for money. To this day we apply the term "counter" to a bench or table, whereon goods are served, and money taken and counted, which formerly denoted little square pieces of wood, or stones, employed to assist the memory in calculation, and corresponded to what the clown, in "Winter's Tale," calls his counters.

We were reminded of this subject by observing that a writer, in describing the objects of Pompeii, has added a note of admiration to the recital of the fact, that chequers were painted upon the door-posts of what is believed to be an inn, and still remain for the instruction of the curious. There is one conclusion, which has often been forced upon us, namely, that under similar circumstances, experience will teach the same lesson, whether the pupil be a Roman or a Sandwich islander. It imports little, therefore, as matter of history, whether our ancestors fell upon this mode of facilitating the casting up of accounts, or whether they owe it to the Romans.

Every thing has two sides: the weary traveller, in quest of a lodging, might fairly greet the appearance of this little token of invitation; but the man, who could find a welcome at home, would interpret it as saying, that nothing is there to be disposed of, not even the common courtesy of a smile, but for the consideration of money.

## EAGLES IN VAN DIEMAN'S LAND.

James Backhouse, a minister of the Society of Friends, who has been several years on a visit to Van Dieman's Land, gives the following account of the ferocity of the eagle:—

"A lady, on a visit at New Norfolk, informed us that she had witnessed the ferocity of the Van Dieman's Land eagle; she was one day chased by one of these birds for some distance, and obliged to run to her house for shelter from it. A similar occurrence happened to a lady on Macquarrie plains. A couple of them have been known to attack a horse. The wife of Richard Barker told us, that one day she observed a horse galloping backwards and forwards, whilst two eagles were chasing it; one driving it in one direction, and the other in another: at length the horse fell, and one of them pounced upon its head; she immediately called some of the men, who drove off the ravenous birds; the poor beast soon regained its feet, and was thus delivered from destruction."

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## A COURTIER ON SERIOUSNESS.

While we laugh, my friends, all things are serious around us. God is serious, who exercises such patience towards us; Christ is serious, who shed his blood for us; the Holy Ghost is serious, who strives against the obstinacy of our hearts. The scriptures are serious in all they say. All that are in heaven and hell are serious. May man then trifle, whose doom is settling every moment?—*Sir Francis Walsingham.*

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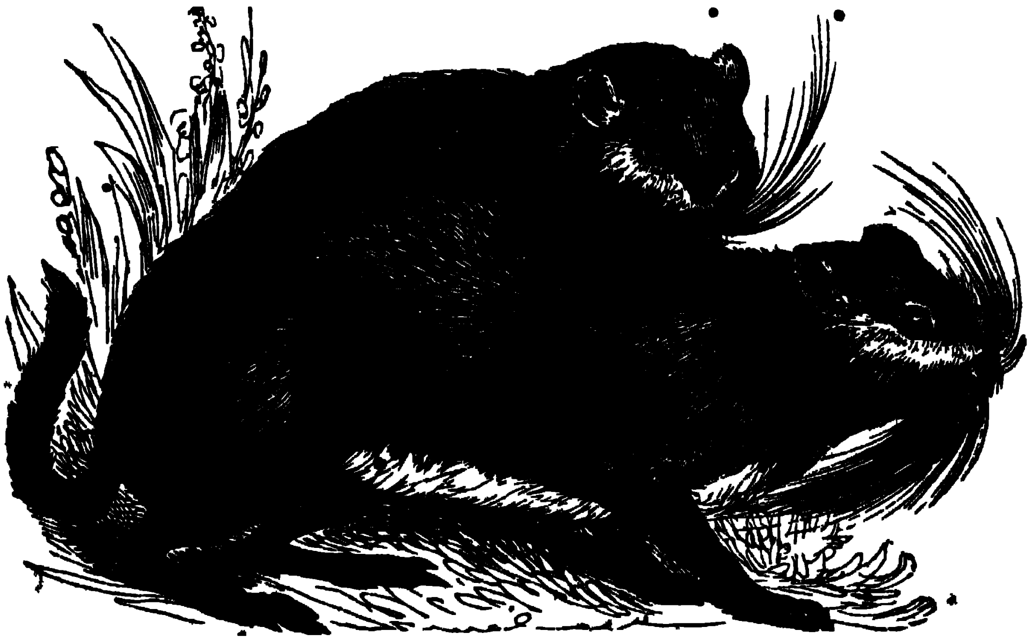


THE VISCACHA, OR PRAIRIE-DOG, OF THE PAMPAS

(Lagostomus trichodactylus Brookes *Callomys viscaccia* Isid Geoff *Marmot Diana* Griff Trans Cuvier)

## THE PRAIRIE DOG

THOSE who have read Captain Head's "Rough Notes of a Journey across the Pampas," cannot have overlooked his frequent allusions to an animal whose burrows are so abundant, and often so thickly clustered together, in those extensive and trackless plains, as to render travelling on horseback far from being without risk, frequently indeed occasioning very serious accidents, and the more so, as the universal custom is, to gallop along at full speed. Several times Captain Head was himself in peril, and numerous were the accidents which occurred either within his knowledge, or which were related to him by others

Abundant as the viscacha is thus proved to be, it is not a little remarkable, that until very lately naturalists should have known hardly any thing about it. In fact, the first notice we have of it appears to be one by Dobrizhoffer, in his "Historia de Abiponibus Viennæ, 1784," or "History of the Abipones, published at Vienna, in 1784" He states, that it is called by these people *nehulaterek*, that it resembles a hare, that it digs burrows in the more elevated parts of the plain, so artfully, that it is impossible for them to be flooded by rain

These burrows are divided, he adds, "into various chambers, as many families inhabit the same locality. On the surface of the ground, there are several entrances leading into the burrow, and around these they sit in groups, towards the approach of sunset, on the listen to catch the sound of any one approaching. If all is quiet, they wander forth at night to feed, and commit sad havoc in the neighbouring fields; for they devour both European wheat and Indian corn, with great avidity, despising grass when either can be obtained. Hence the biscacha stations are seldom to be met with in the desert plains, but with certainty indicate the proximity of Spanish settlements; and it is a matter of surprise, that I have never seen the biscacha in the territories, (although well supplied with crops of all kinds,) either of the Abipones, or of Guaranis. They daily heap up, at the entrances of their burrow, dry bones, chips of wood, and whatever odds and ends they may meet with; but for what purpose they collect such things, it is impossible to conjecture.

"The Spanish settlers occasionally spend an idle hour in hunting them; pouring buckets of water into their subterranean retreats, when the creatures, to avoid drowning, issue out into the plain, and no refuge presenting, are killed with sticks. Unless very old, their flesh is not considered despicable even by the Spaniards."

The abbe Jolis, a Spaniard, who dwelt for many years in South America, also described the visacha, or biscacha, (for the word is differently spelled,) in a work published in 1789, and afterwards in 1801. D'Azzora gave, in his work on the Quadrupeds of Paraguay, a more detailed sketch, from which succeeding naturalists have generally taken their accounts, and which rendered it evident that the animal could no longer be retained among the hares, (*lepus*,) where it had been placed.

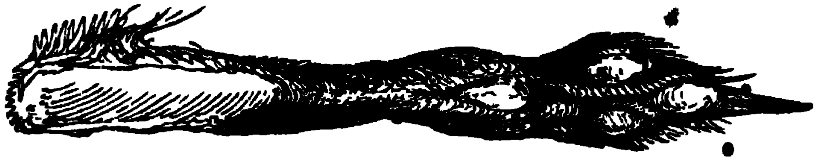
Among recent travellers who have noticed the viscacha, we may mention Proctor, who, in his narrative of a journey across the Cordillera of the Andes, observes:—

"The whole country, from Buenos Ayres to San Luis de la Panta, is more or less burrowed by an animal between a rabbit and a badger, called the biscacha, which renders travelling dangerous, particularly by night, their holes being so large and deep, that a horse is almost sure to fall if he steps into one of them. The biscacha never ventures far from its retreat, and is seldom seen till the evening, when it comes out to feed; and hundreds may be observed sporting around their holes, and making a noise very similar to the grunting of pigs. Their flesh is much liked by the people, and they are remarkably fat, and on that account, when caught at any distance from their holes, are easily run down; they will, however, defend themselves from a dog for a considerable time. The holes of these animals are also inhabited by vast numbers of small owls, which sit during the day, gazing on the passing travellers, and making a very ludicrous appearance. The parts of the road most frequented by the biscacha, are generally overrun by a species of wild melon, bitter to the taste. Whether it thrives particularly in the manure of this animal, or whether the biscacha chooses his hole near this running plant, does not seem to have been ascertained."

The viscacha is an animal of the rodent order, (*rodentia,*) which comprises also the rabbit, marmot, porcupine, and all animals distinguished by two large incisores, or cutting teeth, in each jaw, separated, by a space void of teeth, from the grinders, which have a perpendicularly laminated structure.

In size, this animal, when fully grown, is nearly as large as our common badger. Above, it is of a blackish grey; beneath, white. The head is large and obtuse, and a whitish band, beginning on the nose, passes across the face, beneath each eye, to the root of the ear, producing a sort of crescent-shaped mask, when the face is seen in front. The sides of the lips are furnished with a tuft of thickly-set whiskers, composed of long black bristles; and from the angles of the mouth, across the cheeks, below the band, extends a brush of black bristles, stouter than the whiskers, but shorter, the lowermost being sharply pointed. This brush reaches the angle of the jaw, and forms a true beard; it does not, however, end quite abruptly, but may be traced by bristly hairs intermingled with the fur, across the shoulder, as far as the middle of the back. The ears are moderate, the fore-legs are rather slender and short, the toes are four, and the whole of the palm is bare, the hind legs long, and something resembling those of a kangaroo, though not so disproportionately large. They are, however, formed so as to enable the animal to sit up; the metatarsal bones being long, and the heel furnished with a naked callous sole, before which is a part covered with hair. The toes are three, of which, as in the kangaroo, the middle one is much elongated; all are furnished with strong nails and naked pads. At the end is a sketch, which shews the resemblance to the same part of the kangaroo. The tail is of moderate length, covered with greyish brown hairs, of which the longest form a fringe on the upper surface; it is generally kept like squirrel's, retroverted on the back. The incisor teeth are remarkably large and strong.

Our drawing was taken from one of the several beautiful specimens in the Musee du roi, at Paris. . M.



(Sketch of Under-surface of Hind Foot.)

## ATMOSPHERIC PRESSURE.

Solar light, when uninfluenced by an interfering body, moves in right lines, but in passing through a fluid, a vapour, or a gas, it is bent or refracted from its direction: An upright stick, plunged to some depth in water, appears broken, and the eye does not give us an accurate idea of its real situation and position, nor do we see any of the celestial bodies in their real places, because their light is bent out of its straight course, in passing through our atmosphere. A knowledge of this fact enables us to approximate to a determination of the extent of our atmosphere; for, it has been discovered that, at a height of forty-five miles, it has the power of refracting or bending the solar rays. How far it extends beyond this, we cannot very readily determine, but from the production of sound at much greater heights, we may at least deduce that this is not its limit.

It will readily be perceived that the density of the atmosphere must become less and less as we ascend from the surface of the earth, for all gases and vapours are not only elastic, but are capable of compression into a smaller bulk than they would occupy if uninfluenced. So great is the expansibility of atmospheric air, that if it were perfectly free from the control of all attractive forces, it would expand itself indefinitely But the force of gravity, or, in other words, the attraction of gravitation, which causes bodies to fall to the earth, has a power over the atmosphere, and keeps it around the world in which we live. There are, therefore, two forces acting in different directions, and both are necessary to keep the atmosphere in its present state; there is the attraction of the earth, which draws it to the surface, and the expansibility of the air, which gives it a tendency to throw itself off. If the former acted alone, it would bring the whole mass of air to the surface, and an oppressive density would be produced; if the latter was the only force, the atmosphere would be so rarified, that neither animal nor vegetable substances could exist. But the Creator has so arranged and balanced these two opposing forces, that the atmosphere around the earth is in the best possible state to sustain the creatures with whom he has peopled the world.

But as we ascend from the surface of the earth, the attraction of gravitation decreases, and the expansive power being less and less under control, the atmosphere is in a greater state of rarification. It would be possible to ascend so high above the level of the sea, that the air would be in too attenuated a state to support animal life. The atmosphere may, therefore, be considered as composed of layers, or strata, the lowest being the most dense.

As the air is material, it must have weight, and consequently exert a pressure upon all the bodies which it surrounds. The pressure exerted upon bodies at the surface of the earth is equal to about 15lbs. on every square inch. The body of an average-size man presents a surface of about 2000 square inches, and consequently such a man must sustain a pressure equal to 30,000 pounds. This statement, however, is often misunderstood, and it is imagined that this weight is pressing down the human body, or that a man has to carry it upon his shoulders; but this is an erroneous conception of the manner in which the atmospheric pressure is exerted. The body is surrounded by air, and the pressure is equal in every direction, so that the exterior force upon the body supports rather than oppresses, while the air which is contained within, prevents the external force from producing any injurious effect.

It will require no argument to prove

that the air exerts a downward pressure, and the reader may soon convince himself that it also has an upward pressure. If we take a tumbler, and, filling it with water, place a piece of pasteboard or card at the top, the glass may be inverted without spilling the water, for the card is kept firmly in its place by the upward pressure of the atmosphere, although it has to support the weight of the water.

The Magdenburgh hemispheres are generally employed to prove that the atmosphere exerts a pressure in every direction. Two hollow brass hemispheres are so formed that their lips may fit closely together, and be air-tight. Into one of these hemispherical cups an open tube is fitted, which is furnished with a stop-cock, and a handle that may be unscrewed at pleasure. When the instrument is to be used, remove the handle, and screw the hemisphere to the plate of an air-pump, and placing the other hemisphere upon it, exhaust the air they contain; turn the stop-cock, and remove them from the pump. The handle may now be replaced, and two strong persons will be unable to separate the cups, for the interior air being removed, there is no force to counteract the pressure upon the exterior surface. This experiment admirably illustrates the principle, that the pressure is the same in every direction.

In the study of this remarkable property of the atmosphere we are led to admire its exceedingly beautiful adaptation to the constitution of animal and vegetable bodies. When God placed man upon the earth to pass his state of probation, he had prepared a world for his residence, that was exactly adapted to sustain his life, and to increase all his rational pleasures. And even after his fall, when he was put under a new state of probation, by the mercy of God, these adaptations were not withdrawn, but all the sources of enjoyment that were before derived from the material creation, were still open to him.

The atmosphere by which the earth is surrounded is necessary for the support of animal and vegetable life in its application to the respiratory structure But this is not its only use, for if it exerted no pressure upon bodies, the vessels of the animal and vegetable systems would be unable to sustain the expansion of the fluids they contain. Now, if it had pleased God to place man in a state of misery, the removal of a part of the pressure which rests upon his animal frame would have accomplished the purpose. A sufficient power might have been left to prevent the destruction of life, and yet so much might have been taken away, as to render that life miserable. We may therefore, even in the study of the material creation, gather from the mercies of God, incitements to love him, when the heart has been once reconciled by a confiding trust in the greater work of redemption through Christ.

(To be continued.)

## UTILITY OF WATER.

If we would have a familiar illustration of the importance of the use of water, in the daily and hourly occurrences of life, let us in imagination accompany an individual of moderate rank and condition in society, from the time of his rising in the morning till the hour of sleep at night, in order to observe the utility of water in administering either directly or indirectly to his various wants and habits. How great is the comfort, to say nothing of the salubrity of the practice, which results to him from the application of water to the surface of the body, by means either of the bath or any simpler process! and, again, the change of the linen, in which he is partially clothed, is rendered equally comfortable and salutary, in consequence of its having been previously submitted to the process of washing. The infusion of coffee, or of tea, which is probably an essential part of his earliest meal, could not have been prepared without water; neither could the flour, of which his bread consists, have been kneaded; nor the food of his subsequent meal, the broths and most of the vegetables at least, have been rendered digestible; and, with respect to his common beverage, whether milk, or any form of fermented liquor, water still constitutes the main bulk of that beverage.

So far the use of water is directly and immediately necessary to his comfort and subsistence; but its indirect and remote necessity is equally observable in all that surrounds him. There is scarcely an article of his apparel, in some part of the preparation of which water has not been necessarily employed; in the tanning of the leather of his shoes; in the dressing of the flax of which his linen is made; in the dyeing of the wool of his coat, or of the materials of his hat. Without water the china or earthen cups, out of which he drinks, could not have been turned on the lathe; nor the bricks, of which his house is constructed, nor the mortar by which they are cemented, have been formed. The ink with which he writes, and the paper which receives it, could not have been made without the use of water. The knife with which he divides his solid food, and the spoon with which he conveys it when in a liquid form to his mouth, could not have been, or, at least, have not properly been formed, without the application of water during some part of the process of making them.

By water the medical principles of various vegetable and mineral substances are extracted, and rendered potable; which could not be introduced into the animal system in a solid state; and this element itself becomes occasionally a most powerful medicinal instrument by its external application, in every one of its forms; whether as a liquid, under the name of the cold or warm bath, or in the form of ice, in restraining inflammation and hemorrhage; or lastly, in the state of steam, as in the application of the vapour bath.—*Professor Kidd.*

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### A DYING CHRISTIAN'S PRAYER.

" And they stoned Stephen, calling upon God, saying, Lord Jesus, receive my spirit."—Acts vii. 59.

Here is a prayer to Jesus Christ, to receive the departing soul: and this I put down among the characteristics of every faithful death.

Brethren, I think you will feel in a dying hour, that your departing soul needs a Divine Saviour. You have one in Jesus Christ. You may call upon him then, even as now. His ear will not be heavy, though yours may, when death is sealing up your faculties. His eye will not have lost its power of gazing affectionately on you, when yours is becoming dim and closed. His hand will not be shortened, in the hour when yours will have become tremulous and feeble. But lift up the hand, the heart, the eye, the soul, in prayer to him then, and you will find him a very near and present help in that your time of trouble.

Brethren, a christian should die praying. Other men die in different ways, according to their character and temper. Julius Cæsar died adjusting his robes, that he might fall gracefully. Augustus died in a compliment to Livia his wife; Tiberius, in dissimulation; Vespasian in a jest. The infidel Hume died with pitiful jokes about Charon and his boat; Rousseau, with language of presumptuous boasting; Voltaire, with mingled imprecations and supplications; Paine, with shrieks of agonizing remorse. Multitudes die with sullenness, some with blasphemies faltering on their tongue. But, brethren, the humble christian would die praying. Well says the poet:—

> " Prayer is the christian's vital breath,
>   The christian's native air;
> His watch-word at the gates of death,
>   He enters heaven with prayer!"

But, observe for what Stephen prayed. " Lord Jesus, receive my spirit!" This is the prayer of faith, commending the immortal spirit to the covenant care of Jesus The spirit does not die with the body. None but God, who gave, can take away the soul's existence, and he has declared that he never will. Would that bad men would think on that! You cannot get rid of your soul's existence: you cannot cease to be: you may wish it; though the wish is monstrous and unnatural. But there is no annihilation for any soul of man. Oh, come to our Saviour! give him your guilty soul, to be justified through his atonement, washed in his blood, regenerated by his Spirit. Make to him now that surrender of your soul, for which he calls. Renew this happy self-dedication every day, very specially every Sabbath, and most solemnly from time to time at the Lord's Supper. And then, when you come to die, it will only be, to do once more what you have so often done in former days,—again to commend your soul very humbly, believingly, and affectionately, into the faithful care of Jesus Christ.—*Hambleton.*

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### THE HUMAN INTELLECT.

The vast and capacious powers of the human intellect form a theme on which men always love to dwell. It stirs the spirit of man to be told of the secrets he has extorted from nature; of the stupendous treasures of knowledge which he has heaped up; of the sagacity wherewith he has dived into the abyss of dark and hidden things; of the chariot of fire in which he has ascended to " the brightest heaven of invention."

Of all these glories it is his delight to hear. He sits in pride amid the spoils and the riches of countless generations, till he feels a sort of divinity within him, and begins to scorn the earth upon which he treads. And then comes the loftiness of countenance, and the perversion of heart, which so often turn his knowledge and his wisdom into a snare and a curse. For what will the Lord of all knowledge say to the creature whom he, and he only, hath arrayed in all this magnificence, and prodigality of endowment, what will he say, if his own bounties are to be piled up as a tower whereby men may build themselves a name, and exalt their pride unto the heavens?

If there be any one thing in the course of this world, which proclaims more loudly than another the power, and the majesty, and the goodness of the Almighty, it is the victorious progress of the mind of man. For what are the triumphs of the human mind but manifestations of that One Supreme and Eternal Mind which contains all truth and wisdom; and from which alone the mind of man derives every particle of its energy, every particle and source of its prodigious mastery?

And can any one gravely imagine that these powers were given to man that he might erect himself into a deity, and forget the work of the Lord, and the operations of his hand? The mightiest intellects this world has ever seen have never imagined this. It has been their glory and delight to lay their treasures at the feet of Him who "sitteth enthroned on the riches of the universe." Even those grand and ruling spirits who shone like burning lights in the dark places of the ancient ignorance, even they were often impatient to "feel after" the "Divinity which stirred within them," and to pay Him the honour and the love which are his righteous due, "if haply they might find him." And of those who have lived in brighter and more glorious times, the greatest and the best have always honoured their Creator with all the powers of the understanding which he gave them. And if this was the crown of rejoicing to those master-spirits, what does their great example say to us? Does it not tell us that our intellect was given us for high and holy purposes; that it is a light kindled within us by Him who dwells in light; and that it is both our glory and reasonable service, so to let this light shine before men that they may glorify our Father which is in heaven?—*Le Bas.*

## THE DERVISE.

It was on the confines of the desert, amid sterile and almost inaccessible rocks, that Ben Achmet, the Dervise, led a life of austerity and devotion. A cave in the rocks was his dwelling. Roots and fruits, the scanty product of the inhospitable region he inhabited, satisfied his hunger, and the fountain that bubbled up from the lower part of a neighbouring cliff slaked his thirst.

He had formerly been a priest in a magnificent mosque, and scrupulously conducted the ceremonies of the Mohammedan faith; but, disgusted with the hypocrisy and injustice of those around him, he abandoned the mosque, and his authority as a priest, betaking himself to the desert to spend his days as an anchorite, in sanctity, self-denial, and devotion.

Years rolled over the head of Ben Achmet, and the fame of his sanctity spread abroad. In seasons of drought he supplied the traveller of the desert with water, from his little well. In times of pestilence he left his solitary abode to attend the sick and comfort the dying, in the villages that were scattered around, and often did he stanch the blood of the wounded Arab, and heal him of his wounds. His fame was spread abroad. His name inspired veneration, and the plundering Bedouin gave up his booty at the command of Ben Achmet, the Dervise.

Akaba was an Arabian robber; he had a band of lawless men under his command ready to do his bidding; large numbers of slaves, and a treasure-house well stored with his ill-gotten wealth. The sanctity of Ben Achmet arrested his attention; his conscience smote him on account of his guilt, and he longed to be as famed for his devotion as he had been for his crimes He sought the abode of the Dervise, and told him his desires. "Ben Achmet," said he, "I have five hundred cimeters ready to obey me; numbers of slaves at my command; and a goodly treasure-house, filled with riches; tell me how to add to these the hope of a happy immortality?"

Ben Achmet led him to a neighbouring cliff that was steep, rugged, and high; and pointing to three large stones that lay near together, he told him to lift them from the ground, and to follow him up the cliff. Akaba, laden with the stones, could scarcely move; to ascend the cliff with them was impossible. "I cannot follow thee, Ben Achmet," said he, "with these burdens." "Then cast down one of them," replied the Dervise, "and hasten after me." Akaba dropped a stone, but still found himself too heavily encumbered to proceed.

"I tell thee it is impossible," cried the robber chieftain, "thou thyself couldst not proceed a step with such a load."

"Let go another stone, then," said Ben Achmet. Akaba readily dropped another stone, and, with great difficulty, clambered the cliff for a while, till, exhausted with the effort, he again cried out that he could come no farther. Ben Achmet directed him to drop the last stone; and, no sooner had he done this, than he mounted with ease, and soon stood with his conductor on the summit of the cliff.

"Son," said Ben Achmet, "thou hast three burdens which hinder thee in thy way to a better world. Disband thy troop of lawless plunderers; set thy captive slaves at liberty, and restore thy ill-gotten wealth to its owners; it is easier for Akaba to ascend this cliff with the stones that lie at its foot, than for him to journey onward to a better world, with power, pleasure, and riches, in his possession."

If the words of a Dervise, a blind believer in an erring faith, can command our admiration, how much more ought we to estimate and obey the words of Christ, "Let us lay aside every weight, and the sin which doth so easily beset us, and let us run with patience the race that is set before us, looking unto Jesus, the author and finisher of our faith." Heb. xii. 1, 2. Whether our possessions consist of power, pleasure, or riches, they must be sacrificed rather than be allowed to hinder us in our heavenly course, remembering that "it is easier for a camel to go through the eye of a needle, than for a rich man to enter into the kingdom of heaven."

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## CHEMISTRY.—No. I.

### *Introduction.*

THE different branches of physical science are so intimately connected together, that it is difficult to detail the facts which relate to one without an allusion to those that belong to others. Several papers have appeared in the *Weekly Visitor* on subjects which have an intimate connexion with the science of chemistry, such as those on light, heat, and atmospheric air; and as it is intended to insert others upon the same subjects, it will only be necessary, in this series of papers, to make such allusions to them as will enable the reader to understand their connexion with chemical science.

The object of chemistry is to determine the constitution of bodies, and the laws by which elementary substances are combined. It is, therefore, a science of vast extent, and comprehends an immense number of facts; but it is only within the last seventy or eighty years that it has been cultivated with the assiduity it deserves; but in this period, it has made an almost incredible advance, and now holds a prominent place among the physical sciences. The important facts that have been discovered by the labours of the many distinguished men who have devoted themselves to the pursuit, have now been so arranged as to develope the relations they bear to each other, and in their combination, form a system as clear and comprehensive as it is beautiful. The arts and manufactures in all civilized countries, and in England especially, are more indebted to chemistry than to any other branch of physical inquiry; for a great part of the operations, in manufactures of all kinds, are dependent on chemical laws. Those natural productions, which are the raw materials from which the manufacturer prepares the articles of commerce, must undergo great chemical changes before they are suited to supply the wants, and minister to the comforts of man; and before any improvements, calculated to increase their cheapness and perfection can be made, an accurate acquaintance with chemical laws and facts is absolutely necessary. The iron-founder, the tanner, the bleacher, the glass-maker, the woollen-manufacturer, the brewer, the vinegar-maker, and many others, perform their operations under the guidance of chemistry. The articles employed in domestic economy are subject to chemical laws, and many domestic operations are, strictly speaking, chemical experiments.

All substances on the earth we inhabit, in the air which surrounds us, and in the waters of the ocean, are subject to chemical changes, and to new combinations. There are three states in which bodies are found: sometimes they are solid, or have their particles so intimately united together, that they resist pressure; sometimes they are liquids, the particles of which have an easy motion among each other; and at other times they occur as gases or vapours. There are four agents, light, caloric, electricity, and magnetism, that have, by a strange contradiction of terms, been called imponderable bodies. Philosophers have hitherto been quite unable to determine the nature of these occult agents, and have amused themselves in speculating upon their characters. But although we are ignorant of their nature, yet we know many of the effects they produce, and the influence they have upon the chemical constitution of bodies.

The operations of chemistry are performed by producing changes in the substances under examination, either by means of mixture, or, more generally, by the application of heat. Bodies composed of different substances, distinct in their nature, are in this manner decomposed, or separated into the original substances of which they are formed. This method of discovering the nature of bodies, is called analysis. After decomposition has taken place, if the parts thus disunited have lost their identity, and cannot be brought together again, the analysis is called complicated; but where the parts thus separated are capable of being again united, so as to constitute the same body, it is termed a simple analysis, and the process of reuniting the parts is denominated synthesis. The nature of chemical composition and decomposition may be illustrated by the following experiments.

Drop a piece of camphor into a phial about half-full of diluted alcohol, or common spirits of wine, and a union will take place between these two bodies, from the affinity between them, and the camphor will be perfectly dissolved. Then pour into the phial a small quantity of water, which has a greater affinity for the camphor than the alcohol possesses; a union will instantly take place beween the water and the camphor, and they will fall to the bottom of the phial in white flakes. If the whole be now placed in an open vessel, and a sufficient heat applied, to cause evaporation of the spirit and water, the camphor will be left at the bottom as pure as when first used. This last process is called distillation.

"It may," observes Parkes, "with few exceptions, be considered as an axiom in the science of which we are treating, that whenever chemical action takes place, a real change is produced in the substance operated upon, and that its identity is destroyed. An example will place this in a clear point of view. If a little carbonate of lime (powdered chalk) be put into a glass of water, the chalk will sink to the bottom of the vessel. Though it should be mixed with the water, if left at rest, it will soon subside. No chemical action has taken place, therefore the water and the carbonate of lime both remain unaltered. But if a small quantity of diluted sulphuric acid (oil of vitriol) be added to a glass of chalk and water, a violent effervescence will commence the moment they come into contact with each other; a chemical union of the two substances will be the consequence of this chemical action; the identity of each substance will be destroyed; and sulphate of lime, a substance entirely different from either of the substances employed, will be produced."

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### DR. JOHNSON'S INTERVIEW WITH JOSHUA REYNOLDS IN HIS LAST ILLNESS.

"He sent the other day for Sir Joshua, and, after much serious conversation, told him he had three favours to beg of him, and he hoped he would not refuse a dying friend, be they what they would. Sir Joshua promised. The first was, that he would never paint on a Sunday; the second, that he would forgive him thirty pounds that he had lent him, as he wanted to leave them to a distressed family; the third was, that he would read the Bible whenever he had an opportunity, and that he would never omit it on a Sunday There was no difficulty, but upon the first point; but at length Sir Joshua promised to gratify him in all."—*Miss H. More.*

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VANITY OF EARTHLY GOOD.—There are no contentments of this life, let them be ever so many, that can possibly accompany us farther than our death-bed. It may be, that for a few days of our lives they have detained us in a fool's paradise, yet full of vipers and scorpions. What then shall comfort the immortal soul, when, being dislodged from this tabernacle of clay, it shall begin to enter the confines of eternity? For if it look back, it may ask, Why have I disquieted myself in vain? What hath pride profited, or what profit hath the pomp of riches brought?—*Old MS. Sermon.*

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CARELESSNESS.—The Duke of Richmond, the late postmaster-general, states, that about one thousand letters are annually put into the post-office without any address whatever. In a single year, one hundred of these, which were opened with the design of returning them to their writers, were found to contain money and bills, to the amount of from twenty to thirty thousand pounds.

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THE LAZO.

## THE LAZO.

In the above sketch an ox having been suddenly cast down by the noose, which one horseman had dexterously laid for his foot, another horseman is seen coming up to secure the fallen animal before it has time to recover from the effects of its sudden and violent overthrow.

The term lazo, sometimes erroneously written lasso, in the Spanish language, is of the same import as lazada, and signifies a noose or gin, and is applied by way of pre-eminence to a line ending in a running noose, very much in use among the Chilians. It is made of untanned ox-hide, and, from being in constant use, acquires great smoothness, so that the loop, or knot, traverses or runs without impediment. Its length is about thirty or forty feet, varying according to the skill and dexterity of the person who wields it. The Chilian gathers his lazo into a coil, and fastens one end to his saddle, and, with the additional equipment of a long knife, which is carried in his gaskens, or leathern gaiters, accounts himself a match for whatever he may meet with by the way, whether man or beast. When he has a mind to entrap any thing with this strange missile, he lays hold of the noose, and delivers it with such adroitness, that it very rarely fails to encircle the object aimed at, whether that object be the horn of an ox, or the neck of a human being. They have often been seen, while riding at full speed in chase of an ox, to cast the noose on the ground just where the animal was about to place one of its feet, and thus secure it by its leg. The horses are so trained that the moment the lazo is thrown, they turn and gallop off in an opposite direction; and, as the other end is firmly attached to the saddle, the object entangled has to encounter the force of the horse, when exerted at its maximum, or greatest power, namely, in the act of drawing. It is this circumstance that renders the lazo a fearful weapon, when used against an enemy; for, if from want of foresight or agility, he is taken in this toil, death is his portion, and that of a most revolting kind. Achilles dragged the dead body of Hector, tied to his chariot, over the walls of Troy; but the Chilian takes that method to dispatch a living foe.

Though the lazo is most frequently seen among the Chilians, who are excellent horsemen, and famous for the use of it, it is by no means confined to them, but is met in all parts of Spanish America. Spaniards, who settled in that continent, brought it with them; and the reader, who is acquainted with the Spanish language, may see a short description of it in the Dictionary of the Academy, (Dict. de la lengua Castillana,) printed in 1823. The writer was once under great obligations to a lazo, while collecting botanical specimens, near Tepic, in the Republic of Mexico: for it happened, as he was inspecting the vegetable habitants of a deep valley, that his horse, which had been tied to a tree by the road-side, took fright at the sudden passing of some muleteers, broke his bridle, and began to return towards the city from whence he had started. We instantly pursued him; but the cunning creature, now and then turning his head to observe our progress, kept us for several miles at a convenient distance, till we entered a road that was about twice the breadth of our ordinary turnpikes, when a Mexican horseman came in sight, who alighted, placed his horse on one side of the road, and, extending his lazo, stationed himself on the other. We were as much surprised as delighted to see the wayward steed stop short of the barrier thus suddenly opposed to him, till we had overtaken and secured him. Our obligations did not end here; for the stranger, upon perceiving that the bridle had been broken, immediately, with the dignified gravity peculiar to the Spanish character, set about repairing it, by borrowing a few hairs from the mane of its wearer, and thus in a few minutes restored the dishevelled headstall and reins to their former state of usefulness, and enabled the writer to prosecute his journey with a resolution to be a little more wary in the bestowment of his confidence another time. L.

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## CHEMISTRY, No. II.

*(Attraction of gravitation, cohesion, and affinity.)*

The wisdom of God is remarkably displayed in the simplicity of the laws by which the motions and properties of matter are governed. One great object in natural science is to discover, amidst the multitude of facts and phenomena in the material world, some general principles to which the motions and changes of different bodies may be referred. It was a grand discovery by Sir Isaac Newton, that the planets of our system are directed in their course, and preserved in order and harmony, by the same force that directs falling bodies to the centre of the earth. The unknown cause which produces all these effects, is called the attraction of gravitation. That force which causes all the atoms composing different substances to adhere together, is called the attraction of cohesion; or, the attraction of aggregation. It varies in intensity in different bodies, producing the peculiar qualities that distinguish solids, liquids, and gases. There are many substances that can be presented in all three states, by increasing or diminishing the force of cohesion between the particles. Water, for instance, sometimes exists in the form of ice; but if heat be applied, the attraction of cohesion is weakened, and a liquid is formed. A further application of heat will cause an evaporation of all the liquid, and an air or vapour will be produced. From the circumstance that nearly all bodies are subject to contraction from intense cold, and other remarkable facts that cannot here be detailed, it is very reasonably supposed, that however closely the atoms of bodies may be brought to each other, there is no actual contact between them.

But the particles of substances have not only an attraction among themselves by which they maintain their combination; but also an elective or chemical force, which causes the atoms of different bodies to unite together and form compounds. We are totally ignorant of the real nature of this principle, as well as of the other kinds of attraction that have been alluded to. We have been made acquainted with the laws which govern these several forces, but we are unable to determine whether they are inherent properties of matter, or depend upon some external agent.

The power of which we are now speaking is called chemical attraction, or affinity. It is the principle by which the operations of chemistry are governed; and it is therefore necessary to devote to it a more enlarged consideration. There is a distinction to be observed between two or more bodies being simply mixed together, and their being chemically combined. If some oil and water be shaken together in a phial, they will appear to be united; but if the phial be left for a short time, a separation will take place between the two substances, the water descending to the bottom, and the oil occupying the upper part of the phial. But if a small lump of sugar be dropped into a glass of water, the particles of the sugar will gradually enter into combination with the component particles of the water, and they will be chemically combined. A more lengthened and difficult process will be requisite to separate these two substances, and exhibit them in their original forms.

In order to combine any two or more substances, it is generally necessary (unless heat be applied) that one of them should be a fluid. The reason of this is obvious, if we consider, that before a union between them can be effected, the force of cohesion must be overcome; and it is impossible, by reducing a solid substance to the finest powder, to produce a separation of the ultimate atoms, or most minute particles, that compose it; and the attraction of cohesion is sufficient, in many instances, to overcome the influence of the attraction of affinity.

In some cases of chemical union, the peculiar properties of the different substances brought together are in a great degree preserved; in others, the most remarkable effects are produced. Iron and tin are both malleable and ductile metals; but when melted together, the compound body that is produced, is of a very brittle nature. By the mixture of different metals, changes are also produced in regard to weight, sound, and colour. It is a striking consideration, and a surprising evidence of the wisdom and goodness of God, that some of the most useful and necessary substances in nature, are composed of elements which, combined in different proportions, constitute bodies of the most formidable and destructive character. Water, so mild and agreeable in its nature, and so essential to human existence and comfort, is composed of oxygen and hydrogen, or inflammable air: the common salt, so wholesome and used in so many ways, is formed of two ingredients, either of which, if taken into the stomach alone, would produce instant death: they are called sodium and chlorine. Can we not here most clearly discern the hand of an all-wise Disposer, who, rich in goodness, directs all the combinations of matter, for the convenience and well-being of his creatures? Numberless instances might be adduced wherein the properties of compound bodies are entirely distinct from, and opposed to, the original simple bodies of which they are formed; but a very few illustrations of this kind can be introduced into so brief and general an outline of chemistry.

The attraction of affinity never exists between two bodies of the same kind. Iron has no chemical attraction for iron, nor mercury for mercury. There are also different degrees of intensity in which this force is found to operate. Affinity may exist, but not sufficiently strong for combination. Many ingenious attempts have been made by chemists, to determine the precise degrees of intensity in which this attractive power is to be found. In order to obtain an extensive and thorough acquaintance with the changes that take place in the properties of bodies, it is of the greatest importance to learn the strength of affinity between them. To assist in this acquisition, tables of affinity have been prepared by eminent chemists, which have proved of extensive utility. The plan adopted in these tables is, to place at the head of a column the name of the substance whose affinities are required; and below it, the names of the bodies that have an attraction for it, according to the power they possess. Thus, under the term acetous acid, or vinegar, there would follow successively, barytes, potash, soda, strontites, lime, ammonia, magnesia, allumina. S.

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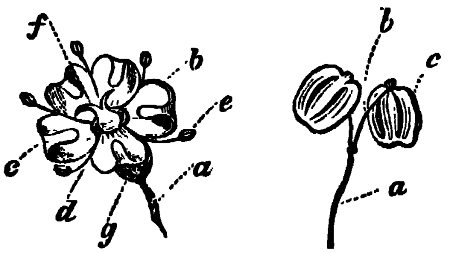
## ANECDOTE OF A NEGRO.

*Letter from Miss H. More to her sister, dated Hampton,* 1782.

"The other morning the captain of one of Commodore Johnson's Dutch prizes breakfasted at Sir Charles Middleton's, and related the following little anecdote:—One day he went out of his own ship to dine on board another: while he was there, a storm arose, which, in a short time, made an entire wreck of his own ship, to which it was impossible for him to return. He had left on board two little boys, one four, the other five years old, under the care of a poor black servant. The people struggled to get out of the sinking ship into a large boat, and the poor black took his two little children, tied them into a bag, and put in a little pot of sweetmeats for them, and put them into the boat; the boat by this time was quite full; the black was stepping into it himself, but was told by the master there was no room for him, that either he or the children must perish, for the weight of both would sink the boat. The exalted, heroic negro did not hesitate a moment. 'Very well,' said he, 'give my duty to my master, and tell him I beg pardon for all my faults.' And then, guess the rest, plunged to the bottom, never to rise again, till the sea shall give up her dead. I told it the other day to Lord Monboddo, who fairly burst into tears. The greatest lady in this land wants me to make an elegy of it, but it is above poetry."

This touching account of the devotedness of a poor negro to his master, may remind us of that passage in holy writ, Rom. v. 7, 8, in which the inspired apostle says, "For scarcely for a righteous man will one die; yet peradventure for a good man some would even dare to die. But God commendeth his love towards us, in that, while we were yet sinners, Christ died for us." The nobleman, mentioned above, burst into tears at the recital of this touching anecdote; how few are duly sensible of the far surpassing love of God towards us rebellious sinners, in giving his only begotten Son Jesus Christ to die for us!

## BOTANY.—No. II.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(Percedanum Officinale—Hog's Fennel.)

### EXPLANATION OF GENERAL BOTANICAL WORDS.

There are a few terms which constantly recur in describing the parts of a flower, that it will be useful for the convenience of the reader to explain, before we begin to treat of those orders or families under which it has been found desirable to place all plants which have a certain well-defined relationship to each other. We recommend our readers to obtain a clear knowledge of these terms, that they may be prepared to enter on the study, and may comprehend our future references. A little pains at first will save much future trouble.

In the above representation of the percedanum officinale, or hog's fennel, a plant very common in salt marshes, the principal parts of a flower are pointed out by the small letters.

Figure 1, *a*. is the peduncle or fruit-stalk, upon which the flower is supported. *b*. The petal or coloured leaf, forming a part of the corolla, or most conspicuous portion of a flower. *c*. Is named the lappet, into which each of these petals is lengthened. This small tongue, or lappet, which is folded back upon the petal, gives a remarkable character to many plants of the umbelliferæ order. *d*. Is the filament, and is one of those slender threads, which support a little yellow head, called an anther, at *e*. The filament and anther together is called a stamen. *g*. Is the germen, by which name the unripe fruit is always known among botanists. *f*. Is the style, a small stem in which the germen always terminates. The tip of the style is called the *stigma*.

Fig. 2. The fruit of the same plant is represented, just before it is ripe. In this, *a*. points to the fruit-stalk, *b*. to a division of it, which leaves a single seed, and is called a receptacle, *c*. is the seed, which is one half of the original germen.

### ORDER—UMBELLIFERÆ.

We begin with this order, since it is the most natural of all orders, and subjects for study are always at hand both in the garden and in the fields. When we say natural, we mean, that the botanist in casting the different genera which compose it into one group or family, has exactly followed the course or dictates of nature; for she has united them by a great many points of affinity and resemblance; whether we contemplate them with the eye of the passing observer, or subject them to the severer scrutiny of a systematic investigation.

We shall now explain the general acceptation of the most important terms, and then illustrate their application by reference to the order before us. The cuts we give will help to make our explanation intelligible.

*Umbel.*—When several flowering stalks radiating or proceeding like rays from the same point of the stem, form a surface more or less even. If we understand the term even, as denoting an unbroken superficies, it is applicable whether the surface thus formed be convex, concave, or level; for the surface of a ball and cup may be said to be even, though the former is convex and the latter concave.

*Lesser umbel, or umblet:* umbellula.—When one of the flowering stalks branches into other lesser flowering stalks, which radiate from a common point. In the angelica the lesser umbels are globular.

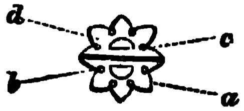
*Involucre,* involucrum.—Leaves that are seated about the point from which the flowering stalks originate, compose the involucrum, and are sometimes called involucral leaves. The reader will remember, that a branch always grows from the bosom or *axil* of a leaf, which is, in fact, its parent, so that we may always say of a stem, where is the leaf that gave it birth? Hence we might expect to find as many leaves below the centre from which the rays of the umbel diverge as there are rays, but this is seldom the case, these leaves being subject to great variation in number, as well as form. Involucral leaves of the wild carrot, or bird's nest, are branched like a feather.

*Involucret*, involucellum.—The leaves that accompany the lesser or partial umbel. In the fool's parsley, the involucrum is wanting; and the leaves of the involucellum, by hanging down, afford an obvious mark for discriminating this plant.

*Fruit-bearer*, carpophorum.— What is generally called a receptacle among botanists. This term may be applied to whatever immediately supports the fruit. In umbelliferous plants, it generally splits into two slender threads, each of them bearing a seed. In fact, this carpophorum is composed of two others, which if they do not part and show themselves distinct as the fruit ripens, a groove may be seen running up and down in the line of separation.

*Calyx*, or perianth.—When small leaves, by growing from the same point, compose a cup for containing the corolla, or internal leaves of a flower, they are called the calyx. In reference to the calyx, these leaves are termed *sepala*. They are often joined by their edges, and form a kind of tube. Among the umbelliferous plants, the student must look for the calyx in those curious little ridges which in most genera are to be found upon the outside of the seed-vessel. For, by one of those countless instances of transformation which take place in the constituent parts of a flower, the divisions of the calyx are changed into a covering for the seed. The form and elevation of these ridges, and the nature of the little valleys, (*valleculæ*,) constitute characters, or the establishment of generic distinctions. In the hemlock these ridges are high, and have their edges notched: in the cow-parsnip the pair of ridges forming the lips of the seam or suture where the two divisions of the fruit *mericarpium*, unite, are expanded into a border: in the chervil or sheep's parsley, they nearly disappear, and nothing but a smooth surface presents itself.

*Vitta.*—Under the ridges, or beneath the little valleys, are found small canals which secrete a gum-resin. They are represented in a transverse section of the fool's parsley, which was the only recent plant we had at hand at the moment of writing this.



(Æthusia Cynapium—Fool's Parsley.)

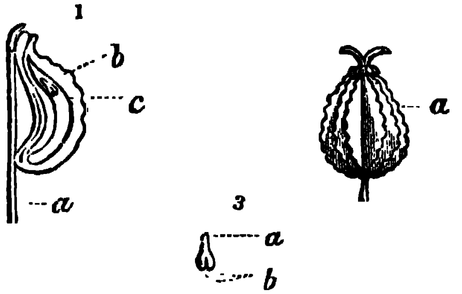
*a.* Ridge. *b.* Vallecula. *c.* Vitta.
*d.* Albumen of the Seed.

*Corolla.*—That circle which is formed by the coloured leaves of a flower, is termed a corolla, little crown or coronet. In the umbelliferous plants, these leaves are unconnected, and are called petals. These petals are in many genera turned up in a small pointed lappet or tongue, as seen in the bastard stone-parsley. Their number in this order is uniformly five: the stamen rises between, or, in other terms, alternates with the petals, and consists of a filament, or slender thread, which is surmounted by a little head, called an anther, which consists of two cells, that open lengthwise, and discharge the pollen, consisting of minute transparent bags, filled with a yellow fertilizing dust. In this order the number of stamens in each flower is five. The pistil, a small centre stem, is composed of a style or shaft, crowned by a stigma, which is generally glutinous, for the detention of the pollen. The base of the pistil is the germen, or rudiments or first beginnings of the fruit. In the umbelliferæ, we have two styles, one to each division of the germen. Stylopodium —They are seen to rise through a flat piece of fleshy substance that rests upon the top of the germen, which gradually dries up as the fruit ripens.

*Seed.*—The seed presents itself as the twin half of the fruit, disengaged when ripe, and hanging upon the thread-shaped supporter, by its upper end. In this position it is ready to obey the slightest impulse of the air, and only waits for a gust of wind to convey it to a distant spot. By such a simple contrivance has the God of nature provided for diffusing of the seed, and multiplying of each particular species.

*Albumen.*—The substance of the seed is fleshy, or rather horny, when ripe, which, because it furnishes material for the support of the plant in the first stages of germination, or early growth, is called albumen. The albumen in general may be defined to be that peculiar substance within the covering of the seed, which, when under a distinct form, invests the embryo, and contains food for its nourishment in the dawn of vegetation.

*Embryo.*—In the upper part of the albumen may be seen, by the help of a magnifier, the minute embryo, having the lower part divided into two lobes, which are called *cotyledons.* These are nearly equal, and are changed by germination into seed leaves, or that pair which first makes its appearance in vegetation. The upper, or undivided part, is termed radicle, or little root, because in germinating it is lengthened into a root.



(Conium Maculatum—Hemlock.)

Fig. 1.—*a.* Receptacle. *b.* Pericarpium. *c.* Embryo.
Fig. 2.—*a.* Ridge.
Fig. 3.—*a.* Radicle. *b.* Cotyledons.

The above cuts of the hemlock represent the parts just described.

The leaves of plants belonging to this order, are generally divided and sub-divided into leaflets. They are said to be pinnate, or winged, when ranged in pairs of opposite leaflets along the leaf-stalk; as in the wild parsnip. If these divisions do not reach to the leaf-stalk, or midrib, the leaves are said to be pinnatifid; as in the cow-parsnip. If the leaflets are collected together in triplets, the leaves are said to be ternate. In the *bupleurum rotundifolium,* or thoroughwax, the stem seems to grow through the leaves, which are, in this case, said to be perfoliate. In budding, the leaves are rolled back upon themselves, and seem to burst from their sheath like the unrolling of a spring. The stem is generally hollow and herbaceous.

### EXAMPLES.

*Hydrocotyle,* umbel simple.—Involucre with three or four leaves; petals without a notch or lappel: seeds nearly round and flattened: ridges thread-shaped: without vittæ or gum, bearing canals.

*H. Vulgaris.* March penny wort.—This plant may be distinguished by the form of its leaf, which is peltate, or have its expansion roundish, and so placed upon the leaf-stalk that its surface is nearly horizontal. We might represent a peltate, or target-shaped leaf, by balancing a penny upon the top of a pencil, though not exactly, for the leaf-stalk is not always in the centre of the expanded part. It is found by the side of streams and ditches.

*Heracleum.*—Fruit elliptical, or oval, flattened, scored by the ridges, which are thread-shaped. Vittæ four on the back of the fruit in the little valleys: two in the seam: pair of ridges at each seam, attenuated into a border.

*H. Sphondylium.*— Cow-parsnip: frequent by hedge banks, and is gathered in the spring for rabbits.

*Conium.*— Fruit, nearly globular, with five notched edges on each side.

*C. Maculatum.*—The hemlock may be known by its stem being much branched and spotted.

*Chærophyllum.*—Involucret bent back, concave. Petals with the lappel bent inwards, so as to resemble a heart. Fruit: oblong, smooth. The last is the mark by which the genus may be distinguished. Seed bent inwards.

*C. Sylvestre.* — Stem smooth, scored, joints rather swoln.

*Cow-weed Chervil.*—Grows in the hedges. Called among those who gather it as fodder for rabbits, sheep's parsley. L.

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### THE GRATEFUL SOLDIER.

After a sermon in aid of the Sunday schools at Leeds, a soldier was observed to put a guinea into one of the plates. So large a sum from one in his circumstances excited the attention of the collector, who took it for granted that it was a mistake, and that a guinea was given where probably a shilling, or even a smaller sum, was intended.

Under this impression he called the man, and told him of the supposed mistake.

The soldier mildly but firmly said, that he had committed no mistake, that he had come with the intention of giving the guinea, that it was the result of the saving of many weeks, and that it was given in pursuance of a resolution which he had made under very particular circumstances.

This statement excited still more the attention of the collector; and, at his request, the soldier went, after the service was concluded, to the vestry-room, where he related the following account of himself:—

He had been in the early part of his

life, educated at a sunday school; where, among other religious instruction which he received, he was taught most of the collects used in the book of common prayer. Some time after leaving school, he entered the army as a private soldier: and here his course of life became so much altered, and he mixed so much with, and adopted the habits of men who had no religious feeling, that he soon lost all that he once possessed. In this way he went on for several years; his early impressions of religion becoming more and more faint, until at last they were nearly worn out. In the progress of his service he was engaged in one of the great battles in which our army had met the enemy, and was most severely wounded; the shock deprived him at first of all sensation; but, when that returned, he found himself stretched on the field, so severely wounded as to be unable to move. The thought of death now came upon him, and brought with it the trembling recollection of the life which he had led, and of his unfitness to appear in the presence of God. He tried to pray; but so long had prayer been neglected, that he could not remember any that he had ever said. At last he brought to mind one of those collects which he had committed to memory when a boy at the sunday school: it was an humble supplication to the Lord for mercy: he repeated it with earnestness and fervour, and found his mind more at ease. Assistance soon after came, and he was removed from the field. He recovered, and, from that hour, became an altered man. In gratitude to God for the mercy which he had found, he resolved to give the first guinea that he could save out of pay, at the first sermon which he should hear preached in aid of sunday schools.—*T. S Grimshawe.*

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### DIFFERENCE OF TEMPERATURE.

A correspondent of the "Times," for October 22, 1834, communicated a copy of his Register of Thermometrical Heights for fourteen days, from which it appeared, that on the 6th of October, the highest temperature was 76°, the lowest 59°; but on the 19th, the highest point to which the thermometer reached was 56°, while 52° was the lowest to which it descended in the night. It is worthy of remark, that while the heat in the shade, by day, had declined 20°, that in the night had fallen only 7°. The cause of this was the alteration from a clear to a clouded atmosphere, added to what is due to the sun's change in declination, or noontide altitude. Now, a denser atmosphere in the day-time diminishes the heat of the sun experienced at the earth's surface, by hindering the appulse, or access, of all the rays which are sent towards us; a clouded sky, at night, stops the radiating, or passing off, of the heat, by interposing a barrier of vapour in a state of condensation, between the earth and the surrounding space. The same condition of the air which operated in depressing the highest temperature registered by day, had the effect of checking that depression at night. We therefore find the same cause, an increase in the density of the vapour, producing opposite effects under different circumstances, and yet with one precise object, namely, that of circumscribing the extent of the thermometrical range. We see how order is provided for and secured in the midst of apparent disorder; how in the midst of inclemencies of change, a tender regard is manifested for animal and vegetable natures. The more severe and rigorous the scrutiny is to which we subject the operations of creative intelligence, with a fuller soul and greater comprehensiveness of meaning do we say, "He hath done all things well." And when we make ourselves acquainted with the laws which direct and control all those changes that the course of nature exhibits, we see in the methods by which they are brought about, that God, in his workmanship, doth often hang the greatest weights upon the smallest wires. In the arts and manufactures, we always see the greatest effects produced by the simplest causes; and were we, in our daily callings, and in the ever-recurring turns of social duty, always to make a singleness of means the ruling principle of our plans and endeavours, we should be more serviceable to our friends, and more comfortable with ourselves, and altogether sustain, with a better grace and propriety, the character of good citizens and consistent christians.

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### SOCIETY.

In the island of Teneriffe, the writer, for the first time in his experience, met with a community among spiders. The species alluded to were of the diadem kind; the web common to several individuals was multifarious and extensive, interspersed with small canopies of exquisite texture, under each of which a spider was seen watching. By what arrangement animals so fierce and unsocia in their manners, could live together in any sort of harmony, it would be hard to say, except it was an instinctive feeling, that the chance of prey, which each member of this community had, was thereby greatly increased.

Thus man, who, in his uncivilized condition, is vindictive and selfish, in exchange for the benefits that result from the social compact, gives up his resentments into the hands of the magistrate, and learns to moderate his feelings of self-interest. We ought to remember that every revengeful emotion, or selfish desire, is directly opposed to the fundamental principles of social welfare, and political order.

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### THE SECRET OF DYING GLADLY.

Believers, behold here the secret of dying! "These all died in faith," Heb. xi. 13. Bad men die reluctantly: life is extorted from them as if by main force. The believer dies willingly; his will is sweetly submitted to his Father's will: he makes it a religious act to die. Just as Jesus himself commended his human soul to his Father, saying, "Father, into thy hands I commend my spirit," Luke xxiii. 46; so his believing disciple commends his soul to Jesus, and through him to the Father. Here, I repeat, is the secret how to die happily. To those who know not that secret, it is a fearful thing to die. It is a serious matter for any. But to the worldly-minded and ungodly, if not past feeling, to die must be as one of the heathen philosophers (Aristotle) confessed it, "of all formidable things the most formidable." Only mention a neighbour's death in a gay circle: lo! you have thrown a gloom over the whole assembly; all are evidently sorry that the topic was introduced. The ancient Romans would not mention death in plain words, if they could avoid it, but only by circumlocution and implication. The heathens, at this day, in like manner, "shun all conversation on death, as most repugnant to their feelings;" I quote the words of an eye-witness, "they account it the height of cruelty to speak of the probability of a sick friend's death, even to his relatives." Even serious christians are often in bondage through fear of death. It is such a venture; a mistake may be so fatal; to go before God is so awful; judgment will bring to light such secrets; that many think, How can I die? Yet you all must. Be persuaded, give your soul to Jesus now; do it again from day to day; and then, when your dying day is come, again approach the Saviour, and say, "Lord, I hear thee calling for my spirit; I see the wagons sent to fetch me home to thee; in the hand of death I recognise thy hand of love: thou askest for my soul; take it, for it is thine. Do with it what thou wilt, I have given it to thee to be washed in thy blood, and sanctified by thy Spirit; I am sure thou wilt do it no harm!"

Does a thought here arise, and what shall become of my poor body? Why, even if, like Stephen's, it were battered and bruised with stones murderously hurled, even though it were burning at a stake, or tortured on a rack, you need not mind; look but that the soul be safe; and then, whatever may become of the body, Jesus will take care of thy dust and ashes. The remains of his faithful servants are to him the most precious parts of this material earth. They form a pledge of his final coming. For if your souls are truly his, he will hereafter raise up your bodies glorious, incorruptible, immortal, like unto his own. Phil. iii. 21.—*Hambleton.*

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Fecundity of the Onion.—It was recently stated that a gentleman in Lancashire had raised 8000 ounces of onions, from 12 ounces of seed. Mr. Crossley, the engineer of the Macclesfield canal, residing at Bollington, having seen this statement, was induced to weigh his own crop, when he discovered, that from two ounces of seed, the produce was the amazing quantity of 2496 ounces, or 156 pounds, being nearly double the produce of the former in proportion to the quantity of seed sown.—*Gloucester Journal, Oct.* 27, 1832.

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Conformity to Christ.—Internal conformity unto the habitual grace and holiness of Christ is the fundamental design of a christian life. Rom. viii. 29. xii. 2. 1 Pet. ii. 22.—*Dr. Owen.*

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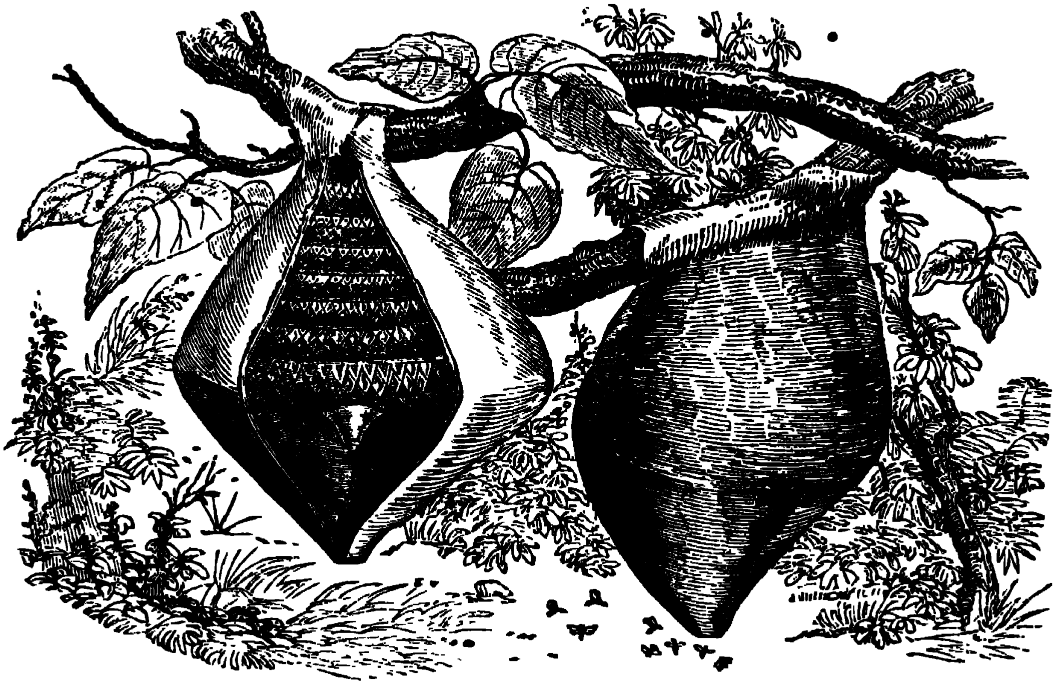


Display of the Interior of the Nest. | Nest of a Species of Wasp from South America.

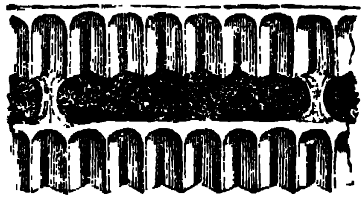
## ON THE NEST OF A SPECIES OF WASP.

THE habitations of many of the insect tribe are celebrated for their ingenuity and beauty. Exquisite and elaborate as are the nests of birds, the most curious and skilfully-woven yield to the superior claims of the productions of these little master-builders, nor can the laborious efforts of human industry match some of theirs; witness, for example, the buildings of the termites of Guinea, and other parts of Africa, *(termes fatalis,)* before which, as a learned writer observes, "the pyramids of Egypt and the aqueducts of Rome would lose all their celebrity, and dwindle into nothing." In our own island, we are not without examples of the skill of insects in architecture, of great interest. The bee and the ant have been extolled for their industry and their works in all ages, and still continue to create undiminished admiration. Nor is that tyrant of the insect world, the wasp, less skilful than the bee in the formation of its nest, which displays the most beautiful workmanship. The labours of the wasp, like those of its cherished relative, the bee, are directed to the preservation of its progeny; it is for the sake of their young, while in the caterpillar or grub state, that both raise their fabric of hexagonal cells. The fabric, however, which the wasp produces, differs in many points very essentially from that of the bee; it is of an irregularly oval figure, and consists of combs, or layers of hexagonal cells, placed horizontally, one above the other, the cells being on the under surface of each stratum, which is supported by strong pillars, arising from the one below; thus twelve, fifteen, or twenty layers, are regularly disposed, the whole being enveloped in an external covering. The sketch at the end of this article may convey an idea of the disposition of the cells, with the supporting pillars.

The whole of this beautiful structure is rendered doubly interesting by a consideration of the material of which it is compacted; and what is this material? Paper, well wrought and firm paper! Of all the paper-manufacturers, the wasp is the oldest; long before man had discovered the important process, taught by Him who is perfect in wisdom and knowledge, this little insect had been making an article, which, now that it is among the products of human art, is most intimately connected with the well-being of society, and the spread of religion and science.

The wasp manufactures, if we may use the word, the paper fabric of its nest from the same materials as are employed by man, namely, vegetable fibres. The fibrous parts of decayed wood, or other such substances, it detaches by means of its jaws, and then masticates them into a pulp, by the addition of a sort of viscid saliva; which pulp, or *papier-mache*, it spreads on the part requiring it, by means of its jaws, tongue, and legs, walking backwards while thus assiduously engaged at its occupation.

The nest of the common wasp, as is well known, is placed in holes in the earth, generally in a sheltered sunny bank, often also in the thatched roof of buildings, &c. In the beauty, firmness, and skill of its fabric, the common wasp of our island, much as its labours are to be admired, is far below many of its foreign brethren. We have now before us the pensile nest of a small species from South America, which exceeds any thing of the kind we have ever examined. Its shape, which may be best conceived from the sketch at the head of our paper, is that of two cones, a larger and smaller, united at their bases. The external wall is composed of firm, tough, white paper, thicker than a stout card, which bears writing-ink without its running, and is smooth and of uniform consistence. This exquisite nest is attached to the branch of a tree, from which it hangs, with the aperture for the admission of the colony at the lower apex. The situation thus chosen, in addition to the position of the aperture, together with its smallness, (for it is not capable of admitting any thing much larger than the body of the insect,) renders the nest impregnable by such enemies as would be likely to covet the larvæ for food; and, indeed, the strength of the fabric itself is a security against the attacks of birds, snakes, or even small mammalia. The total length of the nest is nine inches; the diameter, at the widest part, (where the bases of the cones join,) six. If the external structure, and the situation of this ingenious fabric, demand our admiration, its internal structure is still more interesting and wonderful. Six stout layers, or floors, stretch horizontally across, having cells of the usual hexagonal figure, (but of small size,) on their lower surface, the upper being a smooth platform. These platforms are not, however, flat; on the contrary, they are concave, like a watch-glass, on their smooth or upper aspect, the under or celled one being consequently convex, having the centre protruding suddenly like a cone, which is smooth, without cells, and perforated at the apex, with an aperture corresponding to that of the external envelope, so as to give access from story to story. No verbal description, however, will convey so good an idea as the prefixed sketch, which we have copied from nature, and which faithfully represents the internal arrangement of the stories and their pendent cells, a portion of the outer envelope being purposely cut away. The contemplation of the beautiful and ingenious, in the works of the lower animals, which are guided by unerring instinct in their labours, should lead on the thoughts to Him, who has appointed the ways of all, and ordained every creature to fulfil its place in creation. M.



## LETTER TO THE EDITORS.

### VILLAGE LIBRARY—LUNAR RAINBOW.

GENTLEMEN,—In the village of Adderbury, which is pleasantly situated on the road leading from Oxford to Banbury, about 19 miles from the former place, and three from the latter, and which, according to the last census, contained a population of 1,358 souls, are two of those useful institutions, Village Book Societies. One is supported by the clergyman, and the principal inhabitants, who pay an admission fee of fifteen shillings, and an annual subscription of ten shillings; and the other is intended for the poor, who receive their books, through the kindness of a lady, on paying a subscription of one penny per month. The first library consists chiefly of voyages and travels, natural history, ancient history, biography, works on the arts and sciences, &c.; but all political books, as well as those worse than useless publications, novels, are excluded. There are also some of the periodicals, which tend so much to the improvement of the present age, taken in monthly. The other library is composed of a judicious selection of the volumes published by the Religious Tract Society, and also of a number of others of a similar kind and tendency. The book-case, containing the first library, is kept in a school-room, which is used on sundays for the sunday-school, and, during the week, is appropriated to the education of poor girls, who belong to Adderbury and its hamlet, Milton. The books are exchanged on mondays and wednesdays, when the secretary (who acts gratuitously) or one of the committee, goes to unlock the library for the purpose, at half-past six o'clock in the evening. This, then, brings me to the principal object of my present communication.

On monday evening, the 17th of November last, as the members of the Adderbury Book Society were at their library, they had the gratification of witnessing that rare phenomenon of nature, a lunar iris, or rainbow. It was visible for about ten minutes, between seven and eight o'clock. The moon had passed the full on the day preceding, had then arisen upwards of two hours, and was shining in majestic splendour. The iris was formed by the refraction of the moon's rays from a cold drizzling mist, or rain, which was falling at the time to the west of the spectators; the moon, of course, being to the east of them, or in the opposite direction. The arch was perfectly formed, and presented a faint white, occasionally tinged with the colours of the solar rainbow. The writer of this article has had the pleasure of seeing two of these unusual occurrences; the other happening in June, 1833, while he was returning from Deddington to this village, between ten and eleven o'clock, after attending a lecture on optics, delivered by a gentleman, who was then lecturing in this neighbourhood, and who had that evening introduced the subject of lunar rainbows in the course of his lecture, and had spoken of the rarity of their appearance.

In the Philosophical Transactions for 1783, there is an account of them, communicated by Marmaduke Tunstall, Esq., who states that Aristotle is said to have observed two of these remarkable phenomena. Dr. Plot also mentions the circumstance of Aristotle's seeing two; but adds, that these were all he observed in upwards of fifty years. Plot states this in his Natural History of Oxfordshire, chap. 1, par. 7, where he describes an iris lunaris, as seen by himself at Oxford, on the 23d of November, 1765, about seven o'clock in the evening. There is another mentioned by a writer in the "Gentleman's Magazine," for August, 1688, as being seen at Stoke Newington. C. F.

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## ATMOSPHERIC PRESSURE. No 2.

### THE HOUSEHOLD-PUMP AND BAROMETER.

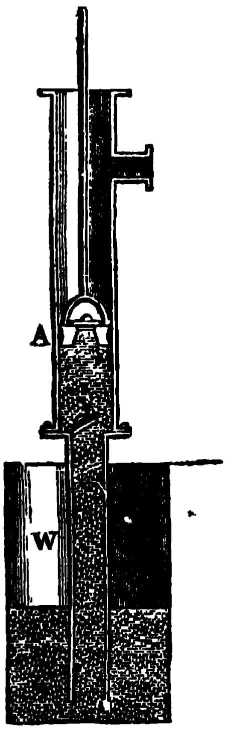
It was long supposed by philosophers, that water rose in a pump because "nature abhors a vacuum," or, in other words, because there can be no empty space. This dogma being received as a principle, it was stated, that as the air contained in the cylinder of a pump was exhausted by suction in the progress of raising the piston, the water must necessarily occupy its place. It was, however, accidentally discovered, in the early part of the 17th century, that water could not be raised in a pump when the sucker or piston was more than thirty-two feet above the surface of the water.

The shortest and least troublesome way of explaining this phenomenon was, to state, that nature did not abhor a vacuum to a greater height than thirty-two feet. This explanation, if such it may be called, satisfied a great many persons who esteemed themselves philosophers. But the celebrated Galileo entertained some doubt of the truth of the dogma, and suggested to Torricelli, who had been his pupil, that some other cause might probably be found, which would be more satisfactory. Torricelli commenced the investigation, and, after having performed a series of experiments, was led to suspect that water could not rise in an exhausted tube to a greater height that thirty-two feet, because it then exactly counterpoised the pressure of a column of atmospheric air, having a base of the same dimensions. But this explanation being correct, mercury ought to rise in an exhausted tube to the height of about thirty inches, for mercury is about thirteen and a half times heavier than water.

Torricelli made an experiment to prove if it were so, and the experiment succeeded. The same experiment may be easily tried by the reader.

Take a glass tube, having one end hermetically sealed, and, filling it with mercury, place the open end in a cup containing the same metal, being careful that no air shall enter the tube. It will be found that the mercury will remain suspended in the tube to the height of about thirty inches from the surface of the metal in the cup, and will there remain stationary. In this position the mercury in the tube exerts exactly the same pressure upon that in the cup, as the atmosphere itself. It is therefore evident, that by determining the pressure of the mercury upon a base of any extent, we shall discover the pressure of the atmosphere. In this way it has been proved that the atmosphere has a pressure of about fifteen pounds upon every square inch.

The principle of the household or lifting pump may be further illustrated by an allusion to the following diagram.



W represents the well from which the water is to be drawn. V is a valve at the end of the cylinder opening upwards: and A is a valve in the piston, also opening upwards. Both these fit the openings closely when the pump is at rest, but are easily moved by a pressure from below.

To explain the process by which the pump has the power of raising water, let us imagine the piston to be brought to the bottom of the cylinder. As the piston is drawn up, a vacuum is left in the cylinder beneath, for the air cannot rush in, as the valve A only opens upwards. But the usual pressure is exerted on the surface of the water, and as there is no air in the cylinder to oppose it, the water rises, and occupies the place from which the air has been excluded. When the piston is forced downwards, the lower valve V, is closed, and the resistance of the water opens the upper valve A, through which it, of course, rushes. When the piston is again elevated, the water is drawn upwards, and makes its escape through the spout. As the pressure of a column of water, thirty-two feet high, is exactly equal to the pressure of an atmospheric column of the same base, water cannot be ever raised in a pump to a greater height.

Torricelli's discovery, as soon as it was known, excited the attention of all the philosophers in Europe. Various opinions were formed, and many of them were, without investigation, unhesitatingly expressed. At first the general opinion was opposed to the accuracy of his deductions, and the ancient dogma was preferred. It was, however, suggested by Descartes and Pascal, that if the suspension of the mercury in the tube was really due to the pressure of the atmosphere, the mercurial column ought to decrease when taken to a place at any considerable height above the level of the sea, as it would then have a less column of air to support.

Perier, the brother-in-law to Pascal, who resided in the mountainous district of Auvergne, was engaged to try the experiment, which he did by observing the height of the mercury at the bottom of the Pay de Dome, a volcanic mountain, and at several heights as he ascended. By this series of observations, he discovered that the height of the mercurial column was governed by the column of atmospheric air it had to support; for it descended in proportion to the height above the level of the sea to which it was carried.

We have not, however, any occasion to ascend a high mountain to prove the truth of Torricelli's theory. The experiment that Perier performed with considerable labour on the Pay de Dome, we may make in our closets, with the assistance of an air-pump. Take a tube hermetically sealed at one end, and filling it with mercury, invert it over a cup containing the same metal in the manner already mentioned, and the mercury will immediately fall to that height at which it exactly balances the pressure of the air. Then place the apparatus under the receiver of an air-pump, and as the exhaustion proceeds the mercury will fall, because there is a decreasing atmospheric pressure upon the surface of the metallic fluid, and when as much of the air as possible has been abstracted, nearly the whole of the mercury will fall into the cup. This experiment is quite conclusive, and demonstratively proves, that a fluid is sustained in an exhausted tube, because of the pressure which is exerted by the atmosphere upon its exposed surface.

Soon after Perier had made his celebrated experiment, it was discovered that the height of a mercurial column varied in the same place, according to the condition of the atmosphere. This observation led to the use of the mercurial column as a barometer or weather gauge, for which purpose it is still employed.

It can scarcely have failed to strike the mind of the reader, that as the fluid falls in proportion to the height above the surface of the earth, to which it is carried, it may be employed to measure altitudes. The importance of this application was appreciated, but at first considerable difficulties were experienced, and many errors were observed, for which the observers could not account. De Luc afterwards discovered that they, in a great measure, arose from not considering the different powers of expansion, possessed by mercury and air; for a temperature which would greatly expand air, might have no influence upon the volume of mercury.

Many celebrated philosophers have been since employed in increasing the facility of measuring heights by the barometer, and so successful have they been, that a traveller may now always determine the relative altitudes of places by its means.

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### OLD HUMPHREY ON OLD HOUSES.

Most people like to look at new houses, especially if they have any thing remarkable about them; now I like to look at an old one. As to a new house, whether it be of brick or stone, lofty or low, the builder himself does not know who will inhabit it "Many a slip tween cup and lip," says the proverb; and many a man, who has a broad house built for him, lies in a very narrow one by the time it is completed. Yes! as to every new house, who shall say if it will be the mansion of joy or the habitation of sorrow? Who will venture to guess if its inhabitants will walk in the way that leadeth to eternal life, or hurry along the downward road to destruction?

An old house is a text, nay, may prove a sermon to a reflecting old man, on the instability of earthly things. He regards the broken tiles, the tottering chimnies, the cracked window panes, the mouldering walls, and the shattered doors, hanging down on their rusty hinges; and, as his eye wanders over the desolate tenement, his thoughts turn to that crazy habitation, his own body, and he sighs as he passes on, "In spite of patching and plastering, the old house must come down at last."

What a world of pains are taken to hide the ravages of time! An old house is often made to look like a new one, but it's an old house, my friends, after all. What if you do paint it with fresh paint, and point it with new-made mortar; will pointing and painting raise up the stooping walls, and strengthen the rotten timbers? No! no! your plans and contrivances will only answer for a time; do what you will, the old house must come down at last.

I have heard of sad accidents occurring when the tenants of old houses have been careless in keeping them in repair, and especially when they have neglected to take warning by the bowing walls and decaying beams, that the building was about to come down altogether. Many have begun repairing too late, and some have been buried in the ruins of their own habitations. It is much the same—no! it is much worse, when, reckless of our lives, or regardless of our health, we needlessly run into danger, or live in an irregular manner, thereby injuring our health; but what fearful consequences follow when an aged and infirm person still calculates on a long life! When the hair turning grey, the furrowed brow, the loss of teeth, the dim eye, the weakly voice, and the faltering step, are all disregarded, till death, like a sweeping tempest, suddenly smites and shakes down the time-worn tenement. My aged friends, do you think of these things? You have had a long lease of it, but for all that the old house must come down at last.

These crazy tenements of ours are but ticklish property, for though they are tenanted by immortal souls, there is no security for their enduring even an hour. We cannot make them proof against fire or water; nor insure them against plague, pestilence, or famine; battle, murder, or sudden death. How easy it is to talk of these things to others, and how hard to bring them home to ourselves. We speak well and act ill. We pass ourselves off for wise men, when we know that we are very fools. But whether we think or act wisely or weakly, time moves along, and takes us along with it.

Every day I feel more and more that I am an old man, and that, though the time may be delayed a little longer, my remaining strength must pass away. Yes! yes! It is a sure and certain thing, that the old house must come down at last.

When I rise in the morning, my cough at times troubles me sadly. My appetite is not quite what it once was. When I walk abroad, my gait is slower than it used to be, and if I drop my stick, I pick it up gently. When I sit down to read, I am fonder than I used to be of a large print, and my spectacles slide a little further down my nose. I love quietness better than bustle. At night, too, my chamber candlestick is taken up half an hour earlier than it was last year. In short, though I am blest, on the whole, with good health, and pass for a hale, hearty old man, I do feel, as I said before, getting older every day, and the truth oftener comes into my mind, "Have a care, Humphrey, for you have had many warnings; and so sure as you have had them, the old house will come down at last."

Do not suppose, my old friends, that because I thus speak, I am over anxious for you to lose time in beautifying or repairing your weather-beaten habitations. It is not the tenement, but the tenant, that I wish you to be looking after; and if I begin by drawing your attention to the body, it is only that I may end by leading you to the preservation of the soul.

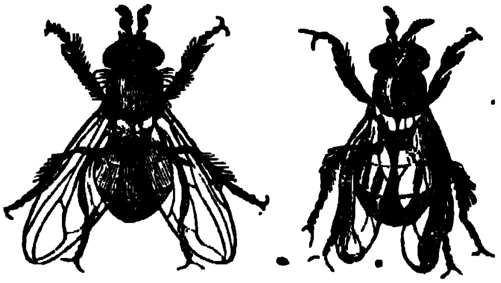
Not that I purpose to weary you with my reflections. No! I wish to call forth your own, for one of your own reflections on this subject will be more useful to you than ten of mine. An hour's secret communion with your own heart will do you more good than listening to me for a whole day. I want to wind you up, and set you going, like a watch; and when I have done that, I may safely leave you to yourselves.

Remember then that when the old house falls, the tenant has to look out for another habitation. Have you fixed upon yours? Is it built on the sands by the sea shore, or on a rock? When the floods rise, and the rains beat upon it, will it stand or fall? Is it a poor, perishing, earthly abode, that will soon pass away, or a building "not made with hands, eternal in the heavens?"

If you have thought of these things, you have acted wisely; and if you have not, think of them now; consult the wise Master Builder, and then, though the old house must come down at last, you will be received into new and everlasting habitations.

## INSECTS.—No. XXXI.

(*Perfect state.*)



[Magnified Blow Fly. | Ditto, newly hatched.]

At length the insect reaches what Linnæus calls its imago state, because, having laid aside the mask, and cast off its swaddling bands, and being no longer disguised or confined, or in any respect imperfect, it is now a true representation or image of its species. This state is generally referred to, when an insect is spoken of without the restricting terms, larva or pupa.

Singular as are the transformations of insects, we need not wonder that some of the metamorphoses described by the ancient poets were deemed possible. Utterly ignorant, as they were, of facts already stated, the change of a caterpillar into a butterfly would be likely to stagger an objector, who affirmed that they could not take place. Even Sir Theodore Margerne, the editor of Mouffet's work on insects, inferred, not two centuries ago, "that if animals are transmuted, so may metals." The doctrine of the metempsychosis—transmigration of souls from body to body—perhaps took its rise from the metamorphoses of insects. A plausible argument in its favour might be derived from the seeming revivification of the dead chrysalis; and its apparent reassumption of life might be considered as owing to its receiving for its tenant the soul of some criminal, doomed to animate an insect of similar habits with those which had defiled his human tenement. The Institutes of Menu say, "A priest who has drank wine, shall migrate into a moth or fly, feeding on ordure. He who steals the gold of a priest shall pass a thousand times into the bodies of spiders. If a man shall steal honey, he shall be born a great stinging gnat; if oil, an oil-drinking beetle; if salt, a cicada; if an household utensil, an ichneumon fly." Thanks be to God that we are not shrouded in such darkness; the gospel has brought life and immortality to light. At the present day, indeed, the transformations of insects, as they are called, have lost that excess of the marvellous which might once have furnished arguments for ancient dreams and fictions; and, wonderful as they are, they ought rather to be termed a series of developments. A caterpillar is not, in fact, a simple, but a compound animal, containing in it the germ of the future butterfly, inclosed in what will be the case of the pupa, which is itself included in the three or more skins, one over the other, that will successively cover the larva. As this increases in size, these points expand, present themselves, and are, in turn, thrown off, until at length the perfect insect, which had been concealed in the succession of masks, is displayed in its genuine form. That this is the satisfactory explanation of the phenomena, has been fully proved by several anatomists

If, however, all this has in it nothing miraculous, it is still calculated to fill us with astonishment and admiration. Reason is indeed confounded at the thought, that a larva, at first no thicker than a thread, includes its own threefold, or sometimes eightfold coverings; the case of a chrysalis, and a butterfly, all curiously folded in each other, with an apparatus of vessels for breathing and digesting, of nerves for sensation, and of muscles for moving; and that these various forms of existence will undergo their successive evolutions, by the aid of a few leaves received into its stomach. And still less are we able to comprehend how this organ should at one time be capable of digesting leaves, at another only honey; how one while a silky fluid should be secreted, at another none; or how organs essential at one period to the existence of the insect, should at another be cast off, and the whole system which supported them vanish!

Just after its exclusion, the insect is weak, soft, and languid; all its parts are covered with moisture, and, if winged, its wings bear so little the appearance, either in shape, size, or colour, which they are about to assume, that it might be taken for a creature only partially formed, rather than one in the most vigorous state of life. If it be a beetle, its elytra, or wing-cases, instead of covering the back of the abdomen, are folded over the breast; their substance is soft and leathery, and their white colour exhibits no traces of the several tints which are to adorn them. If the insect be a butterfly, or a moth, the wings, instead of being of their subsequent size, and variegated and painted with a variety of lines and markings, are, in large specie, scarcely bigger than the little finger nail, falling over the sides of the trunk, and of a dull muddy colour, in which no distinct characters can be traced. If the excluded insect is a bee, or a fly, its whole skin is white, and looks fleshy, and quite unlike the coloured hairy crust which it will become in an hour or two; and the wings, instead of being a thin, transparent, expanding film, are contracted into a thick, opaque, wrinkled mass.

These symptoms of debility and imperfections, however, in most cases, speedily vanish. The insect, fixing itself on the spoils of the pupa, or some other convenient neighbouring support, first stretches out one organ and then another; the moisture of its skin evaporates, the texture becomes firm, the colours come forth in all their beauty, the hairs and scales assume their natural position; and the wings, expanding, extend often to five or six times their former size, exhibiting, as if by magic, either the thin transparent membranes of the bee or fly, the painted and scaly films of the butterfly or moth, or the coloured shells of the beetle.

All this was witnessed with regard to a very interesting and beautiful butterfly, by an eminent naturalist, who says, "The pupa of this, being brought to me by a friend, I had the pleasure to see it leave its puparium. With great care I placed it on my arm, where it kept pacing about for the space of more than an hour; when all its parts appearing consolidated and developed, and the animal perfect in beauty, I secured it, though not without great reluctance, for my cabinet, it being the only living specimen of this fine fly I had ever seen. To observe how gradual, and yet how rapid, was the development of the parts and organs, and particularly of the wings, and the perfect coming forth of the colours and spots, as the sun gave vigour to it, was an interesting spectacle. At first it was unable to elevate or even move its wings, but their numerous congregations and folds gradually yielded, till they had gained their greatest extent, and the film between all the nervures became tense. The ocelli, and spots, and bars, which appeared at first as but germes or rudiments of what they were to be, grew with the growing wing, and shone forth at its complete expansion in full magnitude and beauty."

To you, then, reader, it may be said,

"And shalt thou, number'd with the dead,
No other state of being know?
And shall no future morrow shed
On thee a beam of brighter glow?

"Is this the bound of power Divine,
To animate an insect frame?
Or shall not He who moulded thine,
Wake at his will the vital flame?

"Go, mortal, in thy reptile state,
Enough to know to thee is given;
Go, and the joyful truth relate;
Frail child of earth! high heir of heaven."

But this thou canst only do, in its highest and noblest sense, through faith, which is in Christ Jesus.

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### LOVE OF HOME.

LOVE of home is planted deep in the nature of man. The finger of God points to home, and says to us all, There is the place to find your earthly joy. Shall we appeal to the testimony of those who have sought joy elsewhere or have tried to find happiness in the world? We have but one answer from them all—that the search has been fruitless.

Who aspires to a loftier elevation of honour, than that attained by Burke? And yet he says, he would not give one peck of refuse wheat for all that is called fame in this world.

What is the declaration of Byron, after having drained the cup of earthly pleasure to its dregs? It is, That his life has been passed in wretchedness, and that he longs to rush into the thickest of the battle, that he may terminate his miserable existence by a sudden death.

And Chesterfield, with rank, wealth, talent, polish, and power, after having stood, for half a century, the brightest luminary in all the European circles of elegance and fashion, has left his most decisive testimony of the heartlessness and emptiness of all those joys he had so eagerly pursued.

As we go through this world of trial and of change, we can find our only joy in a life of faith in the Lord Jesus Christ, and domestic peace. Our fire-sides must be our sanctuaries, our refuge from misfortunes, our choice retreat from the world. It is not essential to the happy home, that there should be the luxury of the carpeted floor, the richly cushioned sofa, the soft shade of the astral lamp. These elegancies gild the apartments, but they reach not the heart. It is neatness, order, piety, and a cheerful heart, which makes home that sweet paradise it is so often found to be. There is joy as real, as heartfelt, by the cottage fire-side, as in the most splendid saloons of wealth and refinement.

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### A CAUTION AGAINST PRESUMPTION.

THERE is no encouragement for us to continue in sin, because of the falls of good men. If David falls, he must begin afresh, repent anew, cry, like a poor sinner who had never repented before, "Have mercy upon me, O God, according to thy loving-kindness; according unto the multitude of thy tender mercies, blot out my transgressions," Psalm li. 1. "Create in me a clean heart, O God, and renew a right spirit within me," Psalm li. 10. If Peter falls, he is not to presume, "Oh, I have been a believer, I cannot finally fall away:"—he must go out and weep bitterly. If Job falls, his former hearing, profession, knowledge, are as nothing; he must begin again, he must learn to abhor himself, and repent in dust and ashes. I urge this with earnestness. The doctrines of grace, which are the very glory of the gospel, must not be perverted into encouragements to licentiousness. Mistakes on this point are not uncommon. There are some who say to themselves, "Oh, I have heard of God, I know the plan of salvation, I have correct views of divine truth, I have heard the most eminent ministers; surely, I am not a babe in Christ: no need for me to be laying again the foundation of repentance from dead works." But if your knowledge and hearing, with your profession and attainments, have not kept you from returning to sin, you have need to repent, quite as much as, perhaps more than, that poor sinner, who, for the first time, is smiting upon his breast and crying, "God be merciful to me a sinner!" Luke xviii. 13.—*Hambleton.*

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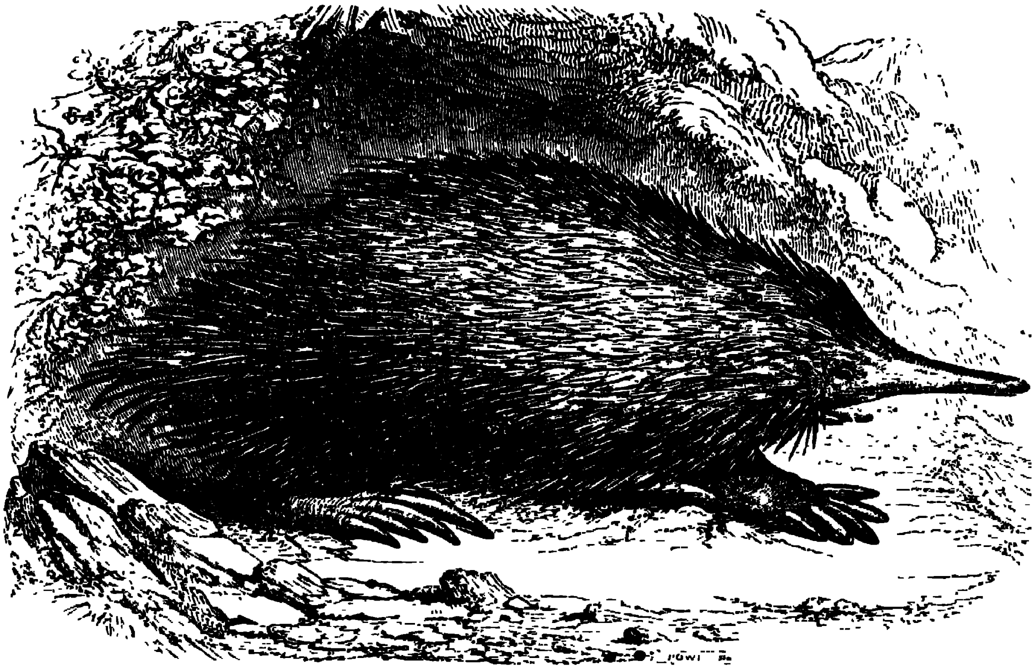

ECHIDNA, OR PORCUPINE ANT-EATER.

### THE PORCUPINE ANT-EATER.

AMONG the many curious animals which the country of New Holland presents to the notice of the scientific, there are none more singular in appearance than the porcupine ant-eater, (*echidna histrix.*)

In many of its anatomical details it closely approximates to the ornithorhynchus, of which we gave an account in No. 52 of this publication; it differs, however, in habits, manners, and external characters.

The ornithorhynchus is aquatic in its habits, pursuing its food in lakes and sluggish sheets of water; on the contrary, the echidna is entirely terrestrial. It passes the greatest portion of its existence in deep burrows, which it constructs with great facility, being well provided with instruments for scooping or shovelling the earth. Its food consists of insects and their larvæ, together with worms, which it takes, like the great ant-eater, with its tongue.

The external character of this remarkable creature may be thus detailed. The muzzle is elongated into a projecting narrow beak-like snout, cleft at the extremity by a small mouth, unfurnished with teeth. The nostrils are oval; the eye is small; from the base of this beak-like snout the forehead rises obliquely upwards, and is covered with bristly hair. The limbs are of enormous strength and thickness; the fore feet being divided into five hoof-like flat, blunt claws, reminding one of those of the chlamyphorus of South America; the inner claw is the smallest.

No better instrument could be devised for burrowing into the earth, or for tearing up the nests of ants, and other insects, on which the creature feeds. The hind feet consist also of five claws, of which the first is short, and rises like a thumb at the junction of the foot to the limb; the other four are of enormous length, and proportionately stout, taking a curved direction outwards. Of these four, the first is the longest, the rest decrease in due gradation. From the base of the claws to the union of the foot with the limb, both before and behind, the interval is very trifling, so that the foot appears as if made up of claws alone. The general shape of the body is broad and compressed, and not unlike that of a hedge-hog; a resemblance the more striking, from the nature of the clothing on its upper surface, which consists of an impenetrable phalanx of bristling spines, much longer and stouter than those of the hedge-hog, much harder and firmer than those of the porcupine. They are directed obliquely upwards, converging in a middle line down the back, and acted upon by a strong muscular expansion beneath the skin. The under surface and limbs are merely covered with stiff hairs. The tail is short and broad, and armed above, like the rest of the upper surface, with a rosette of formidable spines. Rolled up like the hedgehog, the echidna, when attacked, presents to his enemy a *chevaux de frise* of spines which defy his assaults.

In the second part of the Proceedings of the Zoological Society of London, for 1834, p. 23, we find a notice of one of these animals, which a gentleman was endeavouring to bring to England, no living specimen having yet been seen in Europe. The subjoined extract, which we take the liberty of making, may not be uninteresting:—

"A note from Lieut. Breton, Corresponding Member of the Zoological Society, was read, giving an account of an echidna, which lived with him for some time in New Holland, and survived a part of the voyage to England. The animal was captured by him on the Blue Mountains; it is now very uncommon in the colony of New South Wales. He regards it as being of its size the strongest quadruped in existence. It burrows readily, but he knows not to what depth. Previous to embarkation this individual was fed on ant eggs and milk, and when on board, its diet was, egg chopped small with liver and meat. It drank much water. Its mode of eating was very curious, the tongue being used at some times in the manner of that of the chameleon, and at others in that in which a mower uses his scythe, the tongue being curved laterally, and the food, as it were, swept into the mouth. There seemed to be an adhesive substance on the tongue, by which the food was drawn in. The animal died suddenly off Cape Horn, whilst the vessel was amidst the ice; perhaps in consequence of the cold, but not improbably on account of the eggs with which it was fed being extremely bad."

The arrival of the echidna and the ornithorhynchus alive in Europe, would prove highly gratifying to all scientific naturalists, much connected with their habits and structure yet remaining to be cleared up. M.

## REFLECTIONS OF A WORKING MAN.

My Madge had an elderly neighbour, a widow woman, poor as to the things of this world, but rich in God's grace, and heavenly hope and consolation. This neighbour, by what some call "good luck," but what I call God's good providence, got into a nice, snug, alms-house, at some distance, where, living in the fear of the Lord, and trusting in Christ continually, she enjoyed that peace of God which passeth all understanding.

One afternoon, this summer, my Madge took it into her head to go with two of her children, to see her old neighbour, who had often asked her; for Madge is not one to go visiting where she is never invited; and I was to leave work a little earlier in the evening, and go and fetch them home.

The afternoon was uncommonly fine; the sky had colours in it, that none but the Lord of life and glory could have placed there; and the angels in heaven, I should think, could not have looked straight at the sun, without holding up their wings before their faces. When evening came, thinks I to myself, "I'll fetch a bit of a compass round the lanes, and so lengthen my walk, for," thinks I, "Madge will have a world to talk about, for she is a jewel at keeping it up when she begins: her old neighbour, too, is pretty much like her; so they shall have it out."

It was on a thursday, which is market-day, and as I passed a public-house on the road, there sat, on horseback, a youngster chap, with a glass of brandy and water in his hand. He seemed very much at his ease, for he sat a little sideways like, with one leg stretched out very low in the stirrup, and the other cocked up almost as high as the flap of the saddle. I should not have known the liquor he was drinking from ale, had it not been for the silver spoon in it, with which he was trying to crush a lump of sugar against the side of the glass.

Thinks I to myself, "that young fellow is not over-wise, for he has only come a mile from the town, and is baiting already; he is kindling a fire inside of him, that will want some more brandy and water to quench before he gets many miles further." When I got nearer, I saw that he was quite tipsy, and his face almost as the sun in a misty morning. Thinks I to myself, "that is not the first glass of brandy and water, by a many, that he has taken to-day: he looks as fierce as a fighting cock, now he's on horseback, but, for all that, if I had him to walk with me, I'd leave him far enough behind, before I got to the alms-houses.

The sight of the young fellow, and his red face, and the brandy and water, set me a-thinking about the time when I was a great deal too fond of a drop of spirits myself; and I thought, as I walked on, "what a good day that was for Madge and I, when I first saw the Temperance bill posted against the wall. If it had not been for that bill, mayhap I should never have gone to a Temperance meeting, and then I should never, I fear, have had the comforts I have now about me, nor have seen Madge and my children so well clad, nor had what I have now got in the savings' bank." Well, I mused over these things, and thought too what a poor blind creature I must have been, not to see how much I was spiting myself when I drank gin, and rum, and brandy: and then I felt thankful to God for his goodness to me, in opening my eyes, and said over to myself the text in Isaiah, "I will bring the blind by a way that they knew not; I will lead them in paths that they have not known; I will make darkness light before them, and crooked things straight. These things will I do unto them, and not forsake them."

By this time I had got to the turn in the lane where Dr. Chase lives, in the white house, with the yew-trees before it cut into shapes odd and ugly enough to frighten any body on a moonshiny night who didn't know what they were. I heard the trampling of horse's feet, coming helter skelter, at a pretty rate behind me, and, looking back, there I saw the young fellow that I had left drinking the brandy and water, riding along, neck-or-nothing, like a mad thing. You may be sure I lost no time in turning the corner of the lane, and in screwing myself up close against the hedge; "for," thinks I, "this drunkard will make no more of riding over me, than if I were a good tall thistle, or a dock root."

In half a minute the horse dashed round the corner, and off went the young fellow from the saddle; but that was not the worst of it, for his foot was fast in one of the stirrups, and his head went thumping against the ground like a foot-ball. It wasn't a moment for me to stand still, when a fellow-sinner was in danger of being suddenly plunged into an eternal world; so I ran, hallooing after the horse, hoping soon to make somebody hear. It so happened, that a double team was coming along the lane; and so what with the impediment of the wagon and horses, and the exertions of the wagoner, the horse was stopped, and the foot of the young fellow got out of the stirrup. But this wasn't done without a world of trouble; for the horse, frightened, I reckon, at the young chap dangling at his side, dashed against the wagon, knocked off the skin from his shoulder, and limped as if he had been lamed for life. The wagoner caught the reins of the horse, and I lifted up the poor young fellow to get his foot from the stirrup. I never saw a head and face cut so in all my life.

Leaving a lad with the lame horse and the team, the wagoner and I carried the young fellow back to the white house: he was more like a dead thing than a living man. The doctor happened to be at home, and he cut half the hair off the young fellow's head to get at his wounds, and I verily believed, though the doctor said otherwise, that he would never open his eyes again in this sinful world. In two hours' time, however, he was sufficiently recovered to call the nurse ugly names for not bringing out his horse that he might ride home.

As I left the house, I thought to myself, that Madge would wonder what was become of me; so I put my best leg foremost after I had just spoken a word to the lad who had been left with the team.

Well, thinks I, this comes of drinking brandy and water: I have often reckoned up how much I have saved by not spending my money in spirits, but I forgot to reckon how much I have saved in keeping out of scrapes. Let me see, now there is this poor fellow who lies at Doctor Chase's, I warrant he has drunk, at the least, half a dozen glasses of brandy and water, or something next door to it, in the course of the day. That will amount to three shillings, if I reckon them at sixpence a glass. Then his horse is lamed, most likely, for many a day to come; if I put him down at a couple of pounds, it will be under the mark. Then there's the doctor's bill, and if the doctor can put his patient again on his legs, sound wind and limb, for a couple of pounds more, he will do what I take it few doctors would be able to do. Then if I reckon a trifle for the young fellow's time, though I won't go to rate that very high, seeing that few drunkards occupy themselves to much purpose; putting all together, if I let him off for five pounds, I shall not be over hard upon him. Thinks I to myself, what raping and scraping there is in the world, before a man can get together five pounds in an honest way; and then, thinks I again, if I was to get into such a scrape, and it was to cost me five pounds, what a life Madge would lead me! She is as decent a woman, though I say it, as any that walks in shoe-leather; but for all that, whenever I have played the fool, I have always feared her more than any body else in the world, ding donging it in my ears, and letting me have no peace till I had confessed my folly, and promised to keep my cup more upright another time. Well, thinks I, this young fellow has made a five-pound job of it, to say nothing of the pain he has to endure, and remorse of conscience too, if there be any feeling in him, and I shall be more thankful for the future that I am a member of the Temperance Society, than I ever was yet.

In this manner I kept musing and talking to myself, as I made the best of my way to the alms-houses, when who should come across me but Sam Peters! When Sam worked with me at our shop, we used to call him "Sobersides," because he spoke up against drunkenness, and wouldn't join us in drinking, or go with us to the public-house, though, in my heart, I respected him not a bit the less for it. After that he left us, and I hadn't dropt upon him for a matter of two years, to talk with him, for he shyed me, or, as the folks say, "cut" me, whenever we met. Being full of what had taken place at Doctor Chase's door, I spoke first to Sam, thinking, mayhap, he'll be for tipping me the go-bye, if I don't stop him.

"Sam," says I, "how are you? you may venture to speak to me, for I shall neither eat you nor drink you."

"How are you, John?" replied Sam, civilly, but yet as if he was not over anxious to have any thing to do with me.

Now, knowing that I had left off tippling, I felt bold. Often enough have I heard that the strongest armour is that which a man wears within his bosom; and sure enough when a man knows himself in the right, he doesn't shuffle in his replies, and blink and shirk out of sight, as he does when ashamed of himself.

"Sam," says I, again looking up at him, "I don't go to the Black Bull now, as I used to do."

"Perhaps not," says Sam, "mayhap the Red Cow may give better milk just now;" meaning that a better tap might be at the sign of the Red Cow than at the sign of the Black Bull.

"You're rather hard upon me, Sam," says I, "though I know that I deserve it; but, to tell you the truth, I am a temperance man now, and bring home what I get to my Madge, instead of fooling it away in giving it to the landlady of the Black Bull. I am better in my health, we have got comforts about us, and a few pounds in the savings'-bank against a rainy day."

Sam turned quick upon me, with a sharpish look, as if he wanted to know whether I was telling him a lie; but, not reading a lie in my face, he began to inquire all about the matter. So I told him how many things he had said had stuck close to me, and how I saw the temperance bill against the wall, and went to the meeting; and how the man that stood up there told us that three-fourths of the crime, poverty, and wretchedness of the country, came at first from drunkenness; that drunkenness brought about one-half of the madness into the land, and that intemperance was as unsparing as death; and, last of all, that I signed my name to the paper, and became a temperance man.

When I had finished my story, I held out my hand to Sam, saying, I was not ashamed to confess that what he had said in old times had done me good, and that I verily believed, if it had not been for him, I should never have troubled my head about the temperance bill on the wall.

Sam did not speak a word, and this set me a wondering till I looked at him out of the corner of my eyes, and I then saw that he seemed very thoughtful, as if he was a little overcome with what I had aid; and if I ever saw a tear roll down a man's face in my life, I saw one on the cheek of Sam Peters. God above, who formed us, only knows our hearts; but as far as a poor short-sighted sinner is at liberty to judge, I should say that Sam Peters is a kind-hearted, God-fearing, christian man. He wrung me by the hand as I left him to turn into the almshouses, saying he must have some talk with me another time.

In coming home with Madge, I told her all about the young chap at Doctor Chase's, and some sharp things popped out of my mouth against him; and I rattled away at a strange rate about my own leaving off drinking, till Madge, who is as keen as a hawk in seeing what is what, saw that I was over hard on the young fellow, and mighty vain-glorious about myself; nor did she forget to tell me soon after what she thought; for trust her to keep her tongue quiet when she thinks she can do me good by talking. I had raised my voice pretty high in scolding one of the children, for I had told him, as we went along a narrow pathway, to take care of the mud on one side, and he had got into the gutter on the other.

"You needn't snubb the little creature for doing just the same thing that you do yourself," said she.

"What's coming now?" thinks I, looking at my own shoes, for I didn't know whether I mightn't have put my foot into the same puddle.

"What I mean is," says Madge, "that in trying to keep out of one fault, you get into another. It's all very well for you to keep from the public-house, and from drinking spirits; but that's no reason why you should be bitter against any body, and puff off yourself: for, after all, you have done no more than what every christian man is bound to do."

These words put an end to my vapouring about myself, for I felt that Madge was right, though I didn't like to tell her so, lest she sshould carry her chin a little higher than he ought to do. When we got home at night, thinks I to myself, that was rather a cute lesson that Madge gave me; and when at prayer time I opened the Bible to read the chapter, which was the second in Romans, the very first verse went to my heart, for it seemed as if the words were written for me more than for any body else. "Terhefore thou art inexcusable, O man, whosoever thou art that judgest: for wherein thou judgest another, thou condemnest thyself; for thou that judgest, doest the same things."

"Well," thinks I, after I had got up from my knees, "with God's grace and blessing, I'll look a little sharper after myself for the future, and be more merciful to others."

It was an odd thing, but odd things will happen sometimes, that the very next day I again fell in with Sam Peters, who held out his hand instead of shying me, as he used to do. Sam convinced me that I had risen in his estimation; and this made me rise in my own. I was aware of it at the time, but could not help it.

"John," says Sam to me, as we walked along the same way together, "I have been thinking, since I met you yesterday, about your being a temperance man; but I can't make it out at all, why signing a piece of paper should have made you a sober man, when all the good advice you have had, and all the scrapes that the love of drink has got you into, failed to do it. Didn't you often go to the house of God on a sabbath-day?"

"Yes," says I, "before I took to drinking."

"Well, then," says Sam, "didn't you hear a good deal of scripture read sabbath after sabbath? and didn't you learn that no drunkard shall inherit the kingdom of heaven? and didn't you hear warning after warning to flee from the fleshly lusts that war against the soul?"

"Yes, to be sure I did," says I.

"Well, then," says Sam, "I can't understand why, if the fear of God's wrath didn't keep you from drunkenness, that the fear of breaking your temperance oath should."

"I'll tell you," says I, "how I think it was. I heard a good deal against drunkenness, sure enough; but then when I went to the public-house, or began to drink a glass of gin, I never meant to be a drunkard, so that the cap seemed never to fit me. It was the drunkard that was not to go to heaven, but I always intended to be moderate; and when, by little and little, I drank more and more, I was fool enough to leave off going to a place of worship altogether. Now, at the temperance meeting it was pointed out to me in a way that I couldn't mistake, that the safest way was not to take the first glass, or to venture on the path of the drunkard. These principles are in the Bible, which warns us to avoid the beginning of evil; but the Temperance Society, by their speeches and publications, brought out these principles, and so spread before my eyes the sin and the sorrow of drunkenness, that I must have been stone blind not to see my error. The books of the society put us up to all the snares that are laid to catch the drunkard, and surely in vain the net is spread in the sight of any bird."

"Well," says Sam, "there is something in what you say, but there is another thing that I could never get over There are some masters who strain at a spoonfull of spirits and water, who will swallow a bottle of wine without scruple; and some workmen, who will hardly come within the smell of brandy or rum, who can day after day take three times the quantity of ale that is good for them."

"Ay," thinks I to myself, "that is a weak place in our society for certain; but nothing is perfect under the skies, and I hope there are not many temperance men of that sort. What think you of the weather?" says I, for I wanted to get him off that subject; but Sam was not such a ninny as to let me slip through his fingers so easily.

"Do you mean to continue a temperance man?" says he.

"Yes," says I, "I do, and to persuade every body I can to do the same."

"Well, then," says he, "if you will promise me to become a water-drinker, like me, I will join your society, and be a temperance man like you."

This put me in a terrible stew, for I seemed to have been making a halter to hang myself. I had gone on very well without gin, but to live without malt liquor, and work hard too, was quite out of the question. We had just come to a turning, in the very nick of time, so says I, "This will be my nearest way, and if I don't get along at a rare rate, I shall be too late where I am going." Sam wished me a good day, without saying any thing else; but I knew clear enough by his face that he saw through the shuffle I had made; however, it helped me out of the scrape for the time, and that was what I wanted.

As I went forward, I began to turn the matter over in my mind. Thinks I to myself, "I see no use in leaving off malt liquor altogether, and so moderate as we are. Our barrel is just out, to be sure, and it cost me twenty-six shillings, which is a pretty penny; but then it is thirteen weeks since we tapped it. What is two shillings a week for drink among us all? for I do not guzzle it down all myself, as I used to do. No, no: Sam Peters may drink his cold spring water by himself, and much good may it do him, but it would give me the ague; come what will, I'll never give up having a drop of good beer in the house, while I can raise the wind to get it."

As I said this to myself, I trod more firmly on the ground, and, I dare say, looked a little fiercer than common, like a man who is quite satisfied with his own resolution, and determined to stick to it. Still, as I went forward, what Sam had said came uppermost in my mind, and then, too, what I had read about water-drinking in Dr. Franklin's book, jumped into my head, and this brought me back again to my barrel of beer. Thinks I to myself, "Two shillings a week is two shillings a week, after all, and money saved is money got; and if it be true that there's no strength in malt liquor, and some people say so, why the cost of it would look as well in my pocket, as in the pocket of the brewer that I buy it of. I've a great mind to give it up."

In this manner I went on balancing the affair in my mind, sometimes having one scale up and sometimes the other: but I have observed, that in nine cases out of ten, whenever a hesitating man has to judge between his prudence and his inclination, he decides in favour of the latter. The barrel of beer got uppermost, for, thinks I, to work hard in the winter, and to drink nothing but water, as cold as ice, would kill me, I know it would; and then, even if it didn't, and only laid me up for a month, why, what with loss of work, and paying the doctor, it would amount, mayhap, to three or four times as much as I should save by not drinking beer. So once more my mind was made up, not to be persuaded to drink water by all the Sam Peters' in England.

Not being, however, quite satisfied with myself, I began to cast about for something to bolster myself up in my resolution. Thinks I, "There's poor Madge too, and the young ones; they have been used to a drop of beer ever since I joined the Temperance Society, for they got right little of it before; it would be a hard thing to deprive them of what they naturally look for. No," thinks I, "I'll never consent to rob Madge and her young ones of what does them so much good, as I know a drop of good beer does."

This thought helped me up rarely, for I persuaded myself, or at least tried to do it, that it was not my own comfort, but that of my wife and children, that had determined me not to give up my barrel of beer. Before I got home, I thought it might be as well to mention the thing to Madge, as it would show me to be prudently inclined; besides, I made sure that she would say she wouldn't be robbed of the little drop of beer she drank, so that I should pass for a prudent husband, and get my own way after all.

What poor foolish creatures we are when we willingly let our vain thoughts lead us astray! Here was I, weakly and wickedly trying to deceive Madge and myself too; but I was throwing a stone in the air, that was to fall on my own pate. Well was it said, "The heart is deceitful above all things, and desperately wicked."

"Madge," said I, about an hour after I got home, "I have been thinking how comfortable we have been since I became a temperance man." "Ay," says she, "that was a blessed day, John; and we can't be too thankful for it." "But, Madge," says I, "our drink now costs us two shillings a week; and if it wasn't for you and the children, poor things—if it wasn't, I say, for them and for you, mayhap I might try to do without it; and five pounds, or five guineas a year, would be no trifling matter to put by." "If it wasn't for me and the children!" said Madge, looking at me with all her eyes; "What do you mean by that, John? the children hardly ever taste it, and as for me, I did without it when I had not such good food as I now have, nor half the comforts. It will be no trouble to me, nor the children neither, and, therefore, if you think you are strong enough to bear up at your work without it, but I am sadly afraid you will not, why let us give up the drink now the barrel is out, and you can have a new coat the sooner, for your sunday one begins to look rather shabby, and we can all get a little more butcher's meat."

"Well," thinks I to myself, "never was a poor poacher caught faster in a steel trap, than I am; and what makes the matter worse is, that my trap has been set by myself." I was quite dumbfoundered: not a word had I to say for myself; so there I stood like a fool, biting the nail of my thumb, while Madge's tongue ran on, thirteen to the dozen, all in favour of the plan I had proposed. "We can try it, John, we can try it, and time enough to give it up when you find that it weakens you;" and then she rattled away about how many comforts five pounds a year would buy.

Just as I had a little recovered myself, and was thinking what I could say to turn the tables a bit; just as I had drawn in my breath to stop Madge, somebody came in at the door behind me, and on turning round, who should it be but Sam Peters himself, who, knowing the worth of the old proverb, "Strike the iron while the iron's hot," had given himself the trouble to come all the way to our house, to finish up the conversation that had been broken off between us. If you had seen me, you would have pitied me: on one side stood my wife, who knew that Peters was a water-drinker, praising me up to the skies for my great prudence and self-denial, in having proposed to give up malt liquor, and drink water; on the other hand stood Sam Peters, expressing his great pleasure to hear of my determination: and I stood between the two like a bear baited by two dogs, but with this difference, that the baited bear expresses what he feels, but I was obliged to keep what I felt to myself. In five minutes it was settled by Madge, for I couldn't say a word against it, that no more barrels of beer, to the tune of six and twenty shillings a-piece, should darken our doors. Sam Peters said a many handsome things about me, and my decision of character, in having so resolutely adopted the plan. He told me, too, that my having been the first to propose it, showed my sincerity more than if it had been proposed by my wife, and that he did not at all doubt but that I should stick to my purpose. After this, he spoke for some time on the sin of drunkenness, and said that the poverty brought about by a habit of drinking is only one of its evils. "Drunkenness," said he, "shows a departure from God, and a liability to his heaviest judgments. There is a black cloud hanging for ever over the head of the drunkard; a curse attends his bed and his board, his basket and his store, his going out and his coming in." Sam then shook me heartily by the hand as a brother water-drinker, and trusted I should never repent the praiseworthy step which I had so resolutely taken.

Since then, I have thought a good deal on the subject of water-drinking; for though I was dragged to it like a bear to the stake, I begin to find the benefit of the plan. Never was I in better health of body than I now am; never had I greater peace of mind; for things seem to prosper around me, and that prevents our anxiety, and enables me to enjoy my sabbaths, and receive greater comfort from God's holy word than I used to do. My Madge is as lively as a bird, and as good-tempered as though no such thing as trouble ever crost her. My children are hearty as I could wish them to be; I owe no man any thing, and let rent day come when it will, my money is ready for my landlord.

Now, all these things are much in favour of drinking water, but I don't mean to say, that it would suit every one; I only know that it suits me. Some work harder than I do, though I stick pretty close to it, too; and if a draught of beer is now and then taken by them, they will never hear me condemn them for it; but if I were to give my downright opinion on the point, I would say, that where one man hurts himself by drinking too much water, a thousand injure their health by drinking too much beer. When drinking men say they can't give up their pleasures, they seem to think that drunkenness makes a man happier than temperance; but "the proof of the pudding is in the eating." I have tried them both, and find the plain state of the case to be this—Temperance, though it costs a little at first, is a continual blessing; and drunkenness, while it gives men a short-lived pleasure, leads them on to present and never-ending wretchedness.

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## CONTENTMENT.

AMONG the living creatures with which man is conversant, we know of none that presents so fit an example of contentment as the Redbreast. It matters not whether the day be gilded with sunshine, or overcast with clouds, the notes of the robin salute you at every turn. If the weather be bright, you see him perched upon the topmost branch of a tree or shrub; if the rain be descending, he takes shelter under the awning provided for him by a leaf, but no change puts a period to his song: as if in the little head of a robin there was a perpetual spring of joy, which outward circumstances could not influence. When we are uneasy, dull, or melancholy, we ascribe all the blame to outward circumstances, and our imagination sketches many things that would make us happy, not remembering that it is the vessel, as Lucretius says of the heart, that is tainted. This is what spoils the relish of all enjoyments here; it is this tainted vessel that corrupts the wine of our choicest earthly comforts; it is the mortal poison that lurks in the heart which speedily kills by contact every flower of enjoyment. All the sweets of a terrestrial paradise, or all the glories of heaven, could not make us happy, unless this heart was cleansed from its pollutions in the fountain which was opened for sin and uncleanness.

## THE HUMBLE HEART.

"BUT he giveth grace," pours it out plentifully upon humble hearts. His sweet dews and showers of grace slide off the mountains of pride, and fall on the low valleys of humble hearts, and make them pleasant and fertile. The swelling heart, puffed up with a fancy of fulness, hath no room for grace. It is lifted up, is not hallowed and fitted to receive and contain the graces that descend from above. And, again, as the humble heart is most capacious, and, as being emptied and hollowed, can hold most, so it is the most thankful, acknowledges all as received, while the proud cries out that all is his own. The return of glory that is due from grace, comes most freely and plentifully from an humble heart: God delights to enrich it with grace, and it delights to return him glory. The more he bestows on it, the more it desires to honour him with all; and the more it doth so, the more readily he bestows still more upon it; and this is the sweet intercourse betwixt God and the humble soul. This is the noble ambition of humility, in respect whereof all the aspirings of pride are low and base. When all is reckoned, the lowliest mind is truly the highest; and these two agree so well, that the more lowly it is, it is thus the higher; and the higher thus, it is still the more lowly.—*Leighton.*

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## SELF-POSSESSION.

THE mildness of Sir Isaac Newton's temper, through the course of his life, commanded admiration from all who knew him, but in no one instance, perhaps, more than the following:—Sir Isaac had a favourite little dog, which he called Diamond; and being one day called out of his study, Diamond was left behind. When Sir Isaac returned, having been absent but a few minutes, he had the mortification to find, that Diamond having thrown down a lighted candle among some papers, the nearly-finished labours of many years were in flames, and almost consumed to ashes. This loss, as Sir Isaac had no copy of the papers, was irretrievable: yet, without striking the dog, he only rebuked him, with this exclamation, "O Diamond! Diamond! thou little knowest the mischief thou hast done!"

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VIEW OF ROYAL OBSERVATORY, GREENWICH PARK.

## THE ROYAL OBSERVATORY, GREENWICH.

### No. I.

THE above engraving represents the present Royal Observatory, in Greenwich park, (commonly known as Flamsteed House,) which occupies the site of an ancient castle, erected by Humphrey Duke of Gloucester, and of which we gave some account, accompanied with an engraving, at page 1 of our present volume. It is now our intention to give a brief history and description of this very important establishment.

During the reign of Charles II., the naval and commercial interests of the kingdom received more attention from the government than they previously had done; the monarch particularly encouraging every improvement in nautical science that tended to benefit the maritime concerns of the nation. That great desideratum, the determination of the longitude at sea, occupied much attention at this time, and many schemes were contrived for its accomplishment; and amongst others was that of a Frenchman, named St. Pierre, who proposed employing the distance of the moon from the fixed stars, in the solution of this important problem. The subject was referred to the opinion of men of science, more particularly to Mr. Flamsteed, a clergyman, who was afterwards appointed one of the commissioners of longitude, when a reward of 20,000*l.* was offered by the government for an easy solution of the problem.

Mr. Flamsteed, upon examining the foreigner's claims, found that the knowledge astronomers at that time possessed of the elements of the lunar motions, as well as of the positions of the fixed stars, was too scanty to enable him to determine beforehand (or predict) the place of the moon with respect to the other heavenly bodies, this being essentially necessary in the method proposed; and, therefore, until a correct knowledge of these important elements could be obtained, the method was not practicable. This was communicated to the king, who, at the same time, being informed of the proper course to be pursued to supply this deficiency, namely, the establishment of a national observatory, he at once determined upon its adoption; and upon the recommendation of Sir Jonas Moore, a principal officer of the board of ordnance, his majesty appointed Mr. Flamsteed to be his first astronomer royal, directing him, in his appointment, more particularly to apply himself to the rectifying the tables of the motions of the moon, and the places of the fixed stars, with a view of perfecting the art of navigation.

The first thing to be done was the selection of a suitable spot on which to establish the observatory; in this he received the assistance of the celebrated Sir Christopher Wren, (the architect of St. Paul's cathedral,) who recommended the site of Greenwich castle, on account of its elevated and commanding situation. The castle being no longer a favourite resort of royalty, was granted by the king, with liberty to employ the materials of the old building, together with a quantity of bricks from Tilbury Fort, (opposite Gravesend,) in the new erection; towards defraying the expense of which, he granted the sum of five hundred pounds.

The old castle was accordingly pulled down, and the first stone of the present building (which was erected, we believe, from the design of Sir Christopher Wren) was laid on the 10th of August, 1675. During its erection, Flamsteed made his observations at Pelham House, then called the Queen's House, and now forming the central building of the Royal Naval Asylum. This edifice was designed by Inigo Jones, and erected by Charles I., as a residence for his queen, Henrietta, the sister of the King of France.

About a year after the commencement of the observatory, Flamsteed removed his instruments to their destination, where he continued making a series of very important observations during a period of forty-five years. In the seventy-fourth year of his age, this eminent astronomer was removed from the scene of his labours, after a severe illness of four days, on the 31st of December, 1719; he was buried at the parish of Burslow, in Surrey, of which he possessed the living.

The results of his long and useful labours began to be printed, under his own direction, during his lifetime, and were afterwards completed under that of his friends and former assistants, Mr. Abraham Sharpe and Joseph Crosthwait: the former performed much of the necessary computation, and laid down the position of the stars upon the maps, and Sir James Thornhill (the painter of the dome of St. Paul's cathedral, and the Hall of Greenwich Hospital) volunteered his services in drawing the figures of the constellations. The whole was finally published in 1725, in three volumes, folio; under the title of Historia Celestis; a truly grand monument of his talent and industry.

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## FREE JUSTIFICATION.

In the free justification of the sinner before God, and giving him acceptance and peace of conscience, the gospel displays its power unto salvation. It comes to the penitent transgressor as a ministration of righteousness, as a word of reconciliation and peace. It opens the prison doors, and bids the captive go free. The power of the law was great, as represented in the mighty thunderings with which it was given; but, in comparison with the gospel, the law was weak, and could make nothing perfect. The power of the law was for destruction. The power of the gospel is a life-giving power. The law could only hold down the man who was down before; it could never give him life again. But the power to give life is far greater than the power to kill. The gospel is thus mighty to pass by transgressions and sins, to set at liberty the souls that are bound, and to give boldness in the presence of the King of saints to the poor captives of Satan.

When the sinner's heart is brought under the influence of the gospel by the power of the Holy Spirit, it takes away the burden of guilt; it silences every accuser; it fills the believer with the confidence of hope; it forbids every weapon to prosper which is formed against him, and condemns every tongue which rises up in judgment against his soul. The justification which the gospel gives is a perfect and entire one. The sins of a life, however accumulated, however aggravated, are blotted out in one moment, and that for ever. A new and perfect righteousness is bestowed upon the pardoned sinner; and he stands before God, not only without a stain of guilt, but with a character as perfect, and a title to an inheritance of glory as entire, as if he had never transgressed against God.

In the justification of the believer, the gospel makes every thing sure. "Who shall lay any thing to the charge of God's elect? It is God that justifieth; who is he that condemneth? It is Christ that died, yea rather, that is risen again; who is at the right hand of God for ever." And where he is, his followers are also to be. In this total change in the relation of a sinner towards God, the gospel shows its power; it turns aside the edge of judgment, and rejoices in a victory over condemnation; and relieving a soul from fear, from danger, and from death, it shows itself to be the power of God unto salvation.—*Dr. Tyng.*

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## OLD HUMPHREY ON CAPITAL; OR, "PLENTY MORE IN THE CELLAR."

MANY things surprise me in this wonderful world, and, among them, I am amazed at the small capital with which some people begin and carry on business. Were we to judge by the magnificent names that are given to many trading concerns, we might be led to suppose that they must produce a princely return.

"Original Establishment," "Grand Depôt," "Metropolitan Mart," and "National Institution," so amplify our expectations, that we are not, all at once, prepared to witness the slender stock, the "beggarly account of empty boxes," that too frequently compose them. We might almost think by their hand-bills, that some small grocers, who have hardly a chest of tea on their premises, had opened a regular account with the merchants at Canton.

There is a deal of outside in this world, both in persons and things.

I happened to know a civil young man, who, anxious to make his way in the world, opened a shop for the sale of cheese, butter, soap, candles, and such like things; but not possessing ten pounds of his own in the whole world, it was absolutely necessary to set off the little stock he possessed to advantage. His small shop was fresh painted, and the window well piled up with such articles as he had to dispose of. The world around him considered these articles to be his samples, while, in truth, they were his stock. All that he had, with a little exception, he crowded into his window. In a back room he had a few pounds of cheese, butter, and bacon, as well as a shilling's worth or two of eggs and other articles; but the bulk of his establishment was, as I before said, exhibited in his window. Whenever any customers came in, he begged them not to take what they did not like, as he had "plenty more in the cellar."

Every now and then he ran backwards, to fetch some part of the stores he had withheld; his customers concluding, on such occasions, that he had descended to his vaults below for his supplies; for though there was in reality no cellar to the house, no one doubted the observation so frequently made by him, "I have plenty more in the cellar!" Now, I commend his anxiety to make the best of his stock; but his boasting and his falsehood cannot be too severely censured.

Alas! my friends! there are crowds of people in the world acting exactly in the same manner. They begin and carry on their concerns, of whatever kind they may be, with very little capital. They make large pretensions; they carry an air of importance, and pass for what they are not; in other words, like the vender of cheese, butter, and bacon, they crowd all they have into the window, and boldly declare, that they have "plenty more in the cellar."

Do not suppose that I am speaking of shopkeepers only, for I allude to all classes of society. Whatever may be the profession and calling of men, who overrate their means and endowments, who pass for possessors of great capital, either in goods, riches, or talents, when their resources in all are slender; who occupy imposing positions which they know that they are not qualified to sustain, they all come under the same description. You may speak of their conduct in what way you will, but if I attempt to describe it in my homely way, I shall say, that all crowd the little they possess into the window, and try to persuade people they have "plenty more in the cellar."

Again I say, there is a deal of outside in the world. If we knew the little wisdom that is possessed by many a pompous declaimer in praise of his own understanding; and the little wealth in the pockets of many who wear rings on their fingers, and chains of gold around their necks, we should with one consent agree, that their business is carried on with a small capital; that they do, indeed, crowd all they have into the window, and strive manfully to convince the world, they have "plenty more in the cellar."

Do not think Old Humphrey severe; he would not willingly become so, for he knows too well, that in his own heart may be found the germ of every error he condemns in the conduct of others: he must, however, be faithful, even though his remarks bear heavy on himself.

What think ye, my friends? Do you know any to whom these observations will apply? If so, it may be kind of you to repeat to them my admonitions; and if you yourselves should happen to be faulty in the thing of which I have spoken, bear with me, and endure my reproof. It is my own settled conviction, after some knowledge of the world, and some acquaintance with my own heart, that it is a general failing, to "think more highly of ourselves than we ought to think," and that sometimes knowingly, and sometimes unknowingly, we all crowd what we possess into the window, and cry aloud to our neighbours, "We have plenty more in the cellar."

## EXERCISE.

By exercise, the stomach is strengthened, the digestion rendered better, the blood ameliorated, and every animal function improved. The mind also becomes more courageous, corporeal sufferings are borne with patience, a command of temper, and a presence of mind, are acquired and preserved undisturbed amidst pain and danger; the understanding is clear, the imagination untroubled, and the spirits in a fit state for the proper and the most vigorous exertion of our intellectual powers. By this means, also, disease may often be prevented, and not unfrequently cured, even when it has taken a very strong hold of the constitution.

Thus, curvature of the spine and deformity of the chest, complaints which are to be met with so very frequently of late years, particularly among girls and young women in the respectable and higher classes of society, but seldomer among boys, or the children of the poor, originate in debility of the constitution, by which the bones become soft, and consequently yield to the force of the strongest muscles, or to the weight of the superincumbent pressure. The chief, if not the only cause of this debility, may be traced to the unnatural and absurd systems of infantile education, so commonly practised at the present time, whereby children are mewed up in nurseries, and other close and heated apartments, during the greater part of the day. By thus being deprived of exercise in the open air, their powers of life are directly debilitated, and this debility is further increased by attempts to strain their undeveloped minds to the comprehension of things altogether above their understandings. We can well understand the smile that expands the parent's brow, at the display of precocious knowledge which his embryo representative is thus made to exhibit; but did he know the anxious days, the sleepless nights, the pains and lassitudes, he lays the foundation for, by thus straining the tender springs of life, and thwarting nature in her efforts to mature the man, his smile would give place to feelings of a different kind.

In this respect, parents would do well to take a lesson from the lower animals, which act by the unerring instincts which the Almighty has implanted in their nature, and whose actions must be therefore right. Witness the gambols, the constant activity, and the light-hearted cheerfulness of the unrestrained young of all animals, and the encouragement to this sportiveness which they receive from their parents: and after having done so, attentively compare the proportion of cases of bodily deformity amongst them, and amongst men who act by the guidance of reason; and see the immense superiority which their practice has over ours in that respect, and whether it might not be worth our while to profit by the lesson thus afforded us.—*Henderson.*

We consider, from the observations we have made upon the subject, that no hinderance is thrown in the way of physical growth, or a happy developement of the vital energies, by sowing the infant mind with the seeds of wholesome knowledge, in a way suited to their age and capacity.

## CHEMISTRY.—No. III.

### HEAT AND COMBUSTION.

Before we proceed to notice, in succession, the properties of the various substances that fall within the province of Chemistry, it is necessary briefly to direct the attention of the reader to certain remarkable phenomena, developed by the action of heat, on the bodies to which it is applied, as well as to a brief consideration of the phenomena of combustion.

Heat pervades all bodies; existing, either in an insensible, or latent form, not being perceptible to the touch; or, in a sensible form, in which state its presence is made known by the thermometer. A variety of experiments will illustrate this remark. By hammering a piece of wrought iron, by friction, and other means mentioned in page 213 of *Weekly Visitor*, for 1833, latent heat may be extracted from bodies in a sensible form. If a portion of sulphuric acid and nitric acid be mixed together in a cup, and the mixture poured into another cup, containing a small quantity of oil of turpentine, so violent an action is produced, that the whole will burst forth into a brilliant flame. This arises from the circumstance, that the compound has less capacity for heat, than the component substances before they were united. By the application of heat, the bulk of all bodies, whether solid, liquid, or aeriform, is extended; and by extracting it from them, their bulk is proportionably diminished. This might be illustrated by many simple experiments. A knowledge of the theory of the thermometer is sufficient to furnish a satisfactory illustration of this fact. Heat is, in fact, the antagonist of cohesion; and it is this property that renders it the most important agent to the chemist, in his examination of different substances. There exists a larger quantity of latent heat in fluids than in solids, and a still greater quantity is possessed by the gases. The heat requisite to preserve a body in a liquid state, is called the caloric of fluidity; the quantity required to preserve a gaseous body in its particular form, the caloric of vaporization. Whenever, therefore, a fluid is converted into a solid, or a gas into a fluid, the additional heat it possesses escapes in a perceptible form. In the slaking of lime, the water that is used loses its fluidity, and forms a powder with the lime, and during this process, the hot steam that arises from the mixture, is the result of its passing from fluidity to solidity. On the contrary, when a fluid is converted into a gas, heat is withdrawn, and cold is produced. If a thin tube be wrapped round with muslin, and the muslin be repeatedly moistened with the substance called ether, in process of time, the water in the tube will be frozen. The cold is produced by a part of the ether, passing (by evaporation) from the state of a fluid to that of a gas.

Another important property of heat is, to accelerate the solution of salts. Two ounces of Glauber's salts (sulphate of soda) put into a tea-cup of cold water, will not entirely unite with the water; but by applying a sufficient degree of heat, the whole will be dissolved. It is not necessary that these remarks should be further extended on the subject of heat, as its properties have already been more fully stated in the *Weekly Visitor* for 1833, (pages 213, 258.) It may, however, be interesting to the reader to know, that we are enabled to excite a much greater degree of heat, than o cold. The greatest cold produced, is 122° below the freezing point. But a furnace has been constructed, by which an intensity of heat, equal to 25127° of Fahrenheit has been exhibited. But even this heat is far below what may be produced, by means of a Galvanic apparatus.

The phenomena of combustion, or the process commonly called burning, is but imperfectly understood. Many ingenious theories have been offered by different philosophers, who have closely investigated the subject, but even now, there is some diversity of opinion respecting it. The theory of Lavoisier, an eminent French chemist, has, of late years, attracted most attention, and appears most accordant with facts. In his theory, combustion is described as the combination of any body with oxygen. There may be, however, so many instances adduced, wherein combustion evidently takes place without the presence of oxygen, that serious objections are urged against this theory. It appears an unwarrantable practice adopted by some chemists, to apply the term combustion only to those processes of burning in which oxygen is presented; but in all other cases, (and there are as many instances on one side as the other,) to apply the term deflagration.

Professor Donovan, in his treatise on Chemistry in Lardner's Cyclopœdia, observes, "that it is perhaps the safest, because the most comprehensive idea for the student to entertain of combustion, that it is the emission of light and heat from bodies in the act, generally, of combining, but sometimes of separating; that the heat is part of the combined, or latent caloric of the combining bodies; that the light may also proceed from them, although it seems chiefly dependent on one of them,—the combustible." In the phenomena of combustion, we have an illustration of the foregoing remarks, respecting the heat that is evolved from a gas when in the act of combining with another substance, and losing its gaseous form. When the oxygen, or other gas, is absorbed by the combustible body, the heat that escapes is thus explained. "Combustion, therefore, like all other chemical processes, may be explained by the laws of chemical affinity. The combustible having a greater affinity to oxygen, than oxygen has to heat, the oxygen gas is disengaged, and combines with the ignited body, while its caloric, becoming free, produces the heat which is diffused among the surrounding bodies. As the oxygen unites with the combustible, it becomes more dense than when in the state of gas; consequently, it has less capacity for caloric than it had; a portion of it, therefore, must be given out before the oxygen can combine with the new substance that attracts it from its former combination."* When a body has combined with the greatest portion of oxygen, or other supporter of combustion that it will absorb, it is termed an incombustible body.

It is by combustion that substances are converted into acids and oxides, two classes of bodies to which we shall afterwards devote more particular attention. A close examination of all that takes place in substances during the process of burning, will prove the fallacy of a common opinion, with those who are unaccustomed to philosophical pursuits, that in this way bodies are destroyed. It is a remarkable fact, asserting, in an eminent degree, the consummate wisdom of the Creator, in establishing such a provision, that no particle of matter is in this way destroyed; but that the several component parts of any substance are merely separated, and thus prepared to unite with other bodies, and form new compounds. We have abundant reason to believe, that it is beyond the power of man to annihilate one particle of matter, and that all the varieties of form in which matter may be presented, arise from the successive changes through which those indestructible atoms pass, of which the earth was originally constituted; directed by the simple and comprehensive laws our all-wise Creator has established.

## MEDICAL PROPERTIES OF UMBELLIFEROUS PLANTS.

If plants engage our attention by curiosity of structure, and the beauty of their form, they become doubly interesting, when we regard them as yielding either food for our sustenance, or medicaments for the restoration of our health. All can easily comprehend why we should occupy ourselves in the search after plants or simples, when experience shows, that they may be made to minister to our comfort or our necessity. When the writer was travelling in South America, he was often asked by the uninstructed natives, why we devoted so much time and attention to gathering wild flowers; but, when he introduced the explanation of our views by saying, "para los remedios," that they were for pharmaceutical or medical purposes, we found them prepared to listen to us, while we proceeded to state, that their texture, and general history, as well as their useful properties, were matters of anxious curiosity with us. In the same way, we are going to call the mind of the reader to the study of the umbelliferous plants, by showing what reference many members of this order have to the well-being of man; that those who are not affected by the native grace and propriety of knowledge, when unaccompanied by profit, may be induced to think well of the science, for the sake of its utility.

*Angelica Archangelica*, garden angelica.—This plant is a native of Lapland, diffused over all the hilly parts, near streams of water. The Laplanders, as Linnæus informs us, entertain a high opinion of the utility of angelica, and employ it both as a food and medicine. As aromatic plants are rarely found near the polar regions, it is easy to account for the high character which it has obtained among them; for its root has a fragrant, agreeable smell, and a warm, aromatic taste. Lewis says, that "on wounding the fresh root early in the spring, it yields from the inner part of the bark an unctuous, yellowish, odorous juice, which, gently insiccated or dried, retains its fragrance, and proves an elegant aromatic gummy resin. On cutting the dry root longitudinally, the resinous matter, in which the virtue and flavour reside, appears concreted in little veins." Rectified spirit will extract the whole of the virtues of the root; while water, which happens in many other instances of the like nature, will take up but a very small part of its peculiar qualities. If the root be distilled with water, a small portion of an essential oil, with a very pungent taste, may be obtained.

*Angelica sylvestris*, wild angelica.—Found in marshy woods and hedges. It possesses the properties of the archangelica, but not in so high a degree; and it is not so easily met with, since the other is commonly cultivated in our gardens.

*Phellandrium aquaticum*, fine-leaved water hemlock.—This plant may be distinguished by the unusual size of the stem, the fineness of its leaves, and the position of its branches, which are nearly at right angles to the stem from which they proceed. The seeds, according to Dulange, when taken in large doses, produce a remarkable sensation of weight in the head, accompanied with giddiness, intoxication, &c., and therefore may be deemed capable of proving an active medicine. Pliny, who is followed by Doronæus, states, that the seeds are efficacious in the case of calculus, and other disorders of a similar origin. But, in looking over the catalogue of maladies in which this plant is said to be useful, we find that incoherence which makes us suspect the authority of our forefathers; for diseases of an entirely opposite character, and, of consequence, requiring treatment as different, are to be cured, according to them, by administering one and the same remedy.

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* Parkes.

*Œnanthe crocata*, hemlock water dropwort.—Dr. Poulteney has borne his testimony to the efficacy of the juice of this plant in disorders of the skin, but its application was attended with the most alarming symptoms, as it is allowed to be the most fatal of vegetable poisons that are found in this country. Various melancholy instances attest the virulence of this poison; and it is mentioned here, chiefly to caution persons gathering wild salads, against its use. If we cannot teach our country readers to distinguish this weed from the rest of its related plants, we can deliver a very safe and unerring rule, which is—Never to meddle, but for purposes of inspection, with any plant growing in the water, that resembles parsley or celery, for they generally possess active, and very often poisonous qualities.

The *Cicuta virosa*, or water hemlock, which may be distinguished by having its clusters of flowers opposite to the leaves, and the wide foot-stalk of the latter, is poisonous, and is supposed by Haller to have been the hemlock of the Greeks; of which the fickle Athenians administered a fatal dose to Socrates, their greater master of morals. It grows in pools and ditches, and flowers in July and August.

*Bubon Galbanum*, lovage-leaved bubon.—From this plant the galbanum, used in medicine as an anti-spasmodic, is supposed to be derived. The bubon galbanum is a native of the Cape of Good Hope, and was first introduced into Britain by Mr. John Gerard, in 1566, and is now cultivated in the King's Garden, at Kew. The stalk is shrubby, several feet high, slender, purplish, and covered with an ash-coloured exudation. It is round, bending, and knotted, towards the bottom woody and naked. The whole plant presents a smooth appearance, and has an aromatic smell, and an acrid biting taste. Competent judges are of opinion, that the galbanum of the shops, which is generally imported from Turkey or the East Indies, is not the production of the plant before the reader, but of some other species of the same genus. This drug comes to us in large softish, pliant, and pale-coloured masses, which, by keeping, acquire a brownish yellow appearance. These masses are intermixed with distinct clots or tears, which are accounted the best part of them. We find, the colour of the galbanum was a favourite among the Romans, so that galbana rasa, or the hue of galbanum, when scraped, is reckoned by the Roman satirist among the marks of an excessive fondness for dress and fashionable display.

*Carum Carui*, common caraway.—This plant is a native of Britain, growing in low meadows, where it flowers in May and June. The properties of the seeds, which are so familiarly used for economical purposes, are too well known to make it necessary for us to enlarge upon them. It is, however, remarkable, that in distillation with water, that is, if the seeds be put into water, and that water be made to evaporate, the steam carries away all its aromatic part, without leaving any bitterish or ungrateful matter in the water; proving that nothing unwholesome is mixed up with the agreeable and useful qualities of this condiment.

*Ferrula Assafœtida*, assafœtida gigantic fennel.—This plant is a native of Persia, and was first cultivated in England by Dr. Hope, in the botanical garden at Edinburgh, in 1814. Kœmpfer was the first who obliged the world with an accurate description. The stalk, which is two or three yards high and upwards, and six or seven inches in circumference, together with the rest of the herbage, sends forth a strong smell of garlick, but it is from the root the juice is obtained, which, after becoming concrete, is known in our shops by the name of assafœtida. Kœmpfer thus describes the manner in which it is procured on the mountains in the provinces of Chorasan and Zaar in Persia. At that season of the year when the leaves begin to decay, the oldest plants are selected. First, the earth which surrounds the root is rendered light, by digging, and part removed, so as to leave a portion of the root bare; the leaves and stalk are then twisted off, and employed, with other herbs, in constructing a screen to defend it from the sun. In this state, the root is left for forty days; after which, the covering is removed, and the top of the root cut off; it is then screened again for forty-eight hours, when the juice that has exuded upon the wounded surface is collected by means of a proper instrument. This operation is repeated three times at the end of successive periods of forty-eight hours. After the third time, the root is suffered to remain unmolested for eight or ten days, when a similar process for collecting the juice is again repeated. Its qualities are highly stimulating, and it is of great service, especially in cases of torpid digestion.

*Imperatoria Ostruthium*, the common master-wort, is a native of Scotland; as it was found several times by Mr. Lightfoot, growing wild upon the banks of the Clyde. It is cultivated in our gardens; but the shops are generally supplied from the Alps and the Pyrenees; as that which grows in the southern countries is much superior to what is produced among us. The bare denomination of this plant, master-wort, the master herb, intimates to us the high character, for healing qualities, it was once supposed to possess. But the estimation for almost supernatural, "divinum," qualities, has dwindled by time and discovery into that of simply aromatic.

## THE PALO DE VACA.

The Palo de Vaca, which flourishes in Para, in South America, is among the loftiest trees of the forest, growing to the height of a hundred feet and upwards. It bears a delicious edible fruit, which has the united flavour of strawberries mixed with cream, and its trunk yields as fine bowls of milk as those from a cow!

"It seems rather startling," says our author, "to talk of a tree yielding milk, but such is the fact; and it is drunk by the people in large quantities, and was used by us, at the gun-room table, for mixing with tea, in lieu of cow's milk, from which it is no ways distinguishable in general use. The milk is a rich, white, bland fluid, without odour, and of the taste and flavour of common milk. It mixes readily with tea or coffee, without curdling or undergoing any change, and in every respect seems like cow's milk. Boiling water does not alter it. It keeps unaltered six or seven days in the temperature of 85° * * * *. It appears to differ from all the known milky juices of plants, and to approach in obvious properties to animal milk, from which it differs widely in chemical composition. There is no cream or caseous (cheesey) matter; I kept a little of the milk until our arrival at Trinidad, eight weeks after my procuring it, when it was sent to the admiralty. Some, which I had myself, had then separated into a sourish milky water and a white solid mass, which, when taken out and dried in the air, was a white inflammable substance, not softening at the temperature of the body, melting at 143°, tasteless, insoluble in water or spirits, and resembling white wax more than any other substance to which I could compare it. It burned with a bright agreeable flame, without smelling, and was neither greasy nor resinous; I am, therefore, inclined to consider it a species of wax."

To complete the marvels of this tree, we must mention, that it affords the most valuable timber for ship-building, and that it is so used in the dock-yards at Para.—*From Webster's Narrative of Foster's Voyage in the Chanticleer.*

## CONTRADICTIONS.

In unclear and doubtful things, be not pertinacious, as the weakest minds are readiest to be upon seeming reason, which, when tried, will possibly fall to nothing; yet they are most assured, and cannot suffer a different thought in any from their own. There is naturally this popeness in every man's mind, and most, I say, in the shallowest; a kind of fancied infallibility in themselves, which makes them contentious, contrary to the apostle's rule, "Let nothing be done through strife or vain-glory," Phil. ii. 3, and as earnest upon differing in the smallest punctilio, as in a high article of faith. Stronger spirits are usually more patient of contradiction, and less violent, especially in doubtful things; and they who see furthest, are least peremptory in their determinations. The apostle, in his second epistle to Timothy, hath a phrase, "the spirit of a sound mind:" it is a good, sound constitution of mind, not to feel every blast; either of seeming reason, to be taken with it; or of cross opinion, to be offended at it.—*Leighton.*

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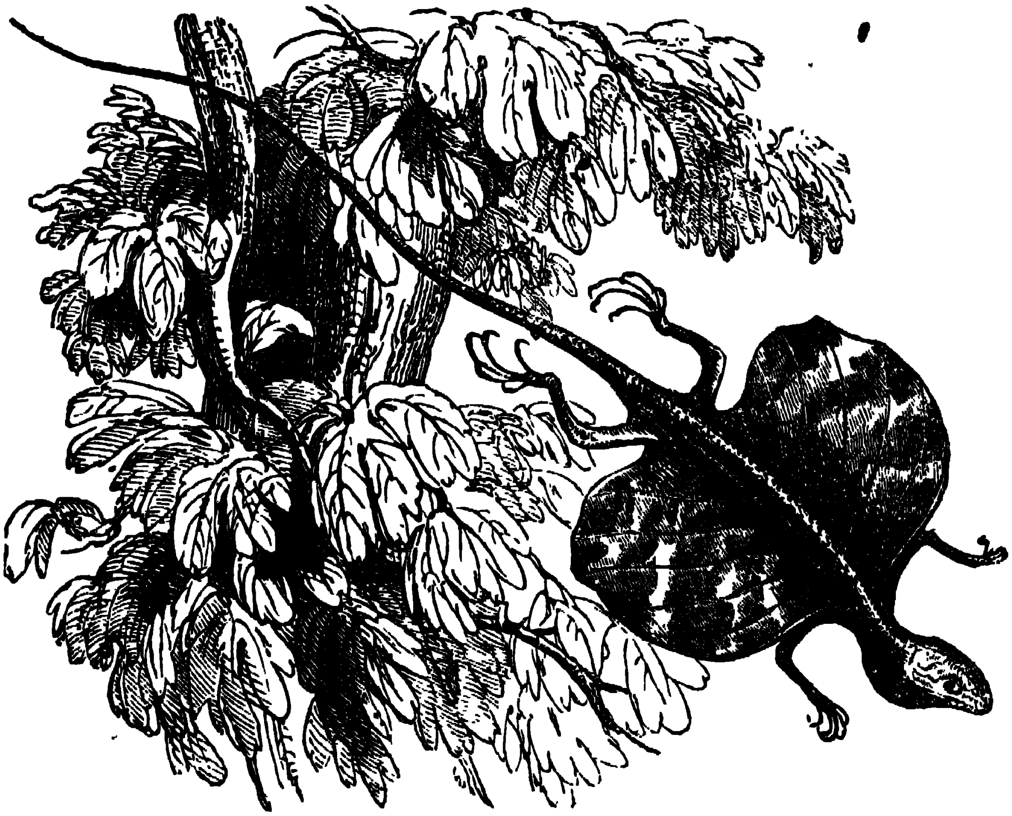

FLYING DRAGON, NEARLY NATURAL SIZE.

## THE FLYING DRAGON.

THE "gorgons, hydras, and chimeras dire," monsters with which credulous ignorance once peopled the foreign regions of the earth, have vanished before the light of science; and we smile at the names and pictures of beings, which could not have possibly existed, inasmuch as their component parts could not be associated together, without a violation of the laws of nature. Fear may give wings to the mighty boa, but wings would not assist his progress; neither, indeed, could they be possessed by him, and for the following reason—The plan upon which the skeleton is built prevents it. In snakes, there is no sternum or breast-bone; no clavicles—no scapulæ,—and these are essential to the presence of true effective wings. Look, for example, at the skeleton of a bird: behold how vast is the sternum, affording a wide space to be occupied by the peculiar muscles which act upon the organs of flight; and, besides the clavicles, which support the shoulders, and keep them duly forward, observe the furculum, or merry-thought, strictly analogous to the clavicles in man, keeping the shoulders wide apart, by bearing the strain of the muscles, which tend to bring them together. Look again at the short, firm, and almost immoveable back-bone; whence arise the strong ribs, locked upon each other, and uniting firmly with the edge of the sternum. But the structure of the skeleton in the snake is the opposite to all this; short, slender ribs, and a back-bone composed of a multitude of distinct portions, united by a ball and socket mode of articulation; such is the skeleton of the long and tortuous serpent. The dragon of romance lives only in sickly and unnatural fables; the name, however, is still retained in science, and applied to a group of most beautiful and harmless little lizards, of one of which we give a figure at the head of the present number; it is the Draco radiatus.

Among the strange and anomalous beings, whose existence, at some distant epoch of our earth, is proved by the researches of geology, which have brought to light their fossil remains, we find a flying lizard, to which Cuvier has given the name of Pterodactylus, and which, as the construction of its skeleton abundantly proves, was capable of skimming from one point to another, or perhaps even of flitting on wide membranous wings. That these wings were membranous, may be readily concluded, from the circumstance of their being supported upon long slender bones, very like what we find in the wing of the bat; in short, they acted as stretchers, when the wings were expanded. These stretchers of the membrane were, indeed, neither more nor less than the bones of the second finger of each fore paw, lengthened out so enormously, as to extend to more than double the length of the rest of the body. The neck was very long; the head large; and the jaws armed with pointed teeth; the tail being very short. The appearance of such a creature sweeping through the air, (small as was its size,) would be almost terrific to the timid or ignorant, were it now a denizen of the earth: it has, however, passed away, a few fossil relics being all that testify of its having once existed.

In some respects, the little Draco resembles the Pterodactylus, having a membranous expansion attached to the sides, but not connected to the limbs, which are perfectly free. This membrane, which is a continuation of the skin, is supported by six false ribs on each side; for these, instead of turning down so as to encircle the body, are considerably elongated, and constitute the frame-work of this natural parachute. We call it a parachute, rather than wings, because it is not moved as wings are, in order to strike the air, but is merely expanded, so as to enable the little creature to take long, sweeping leaps, from branch to branch, or tree to tree; where, among the leaves, it searches for its insect food. Hence, it cannot be said to fly, as does the bat or the bird; it cannot, like them, raise itself into the air, its aerial progress being limited to a long, sweeping leap. In this respect, it is like the flying squirrels (sciuropterus) which have a membrane extending along the sides, between the anterior and posterior extremities, so as to endow them with the power of taking long, skimming leaps, among their native woods, and of precipitating themselves with safety from the highest branches, either to the ground or to a distant branch.

The characters of the genus Draco, in addition to the membranous wings, or parachutes, are as follows:—The body is covered with minute scales; the tongue is fleshy, and capable of very little power of protrusion, contrary to what forms so remarkable a feature in the chameleon. Beneath the throat there hangs a pendulous fold of skin, forming a sort of dew-lap of considerable extent; the tail is long and slender; the teeth in each jaw consist of four little incisors in front, and, on each side, a sharp canine tooth, and twelve little triangular grinders, each having three projecting points, one at each angle of the surface. Three species are known and described, all natives of India; in whose forests, amidst the covert of leaves, to which they themselves bear no unapt resemblance, they find shelter and food. M.

## AN EPITAPH.

It was a beautiful morning, when I entered the church-yard of a country town to examine and admire the goodly structure before me, and to enjoy the lovely prospect which stretched beyond its walls. While I sat upon the turf, viewing the scene around, a row of family graves caught my attention, and I read on one of the monumental stones, an inscription to the memory of a young lady who died about the beginning of the present century, "aged eighteen years." It was as follows:—

"Here innocence and virtue lie, whose breath
Was snatch'd by early, not untimely death.
Hence did she go, just as she did begin
Sorrow to know, before she knew to sin.
Death, that does sin and sorrow thus prevent,
Is the next blessing to a life well spent."

I could not but consider the sentiment expressed in these lines as contrary to the express declarations of the word of God, and the sentiments which, in the liturgy and articles, at least, and I have reason to believe from the pulpit also, are often heard within the neighbouring church. As I left the church-yard, the idea came across me that I was mistaken in the age, that it must have been some infant's memorial, perhaps a child of eighteen days. I returned, but read distinctly, "Aged eighteen years." How then, thought I, can this be reconciled with Eccles. vii. 20, "There is not a just man on earth, that doeth good, and sinneth not;" or Ps. xiv. 2, 3, "They are all gone aside, there is none that doeth good;" or Gen. vi. 55, "Every imagination of the thoughts of man's heart is evil;" viii. 21, "The imagination of man's heart is evil from his youth;" Jer. xvii. 9, "The heart is deceitful above all things, and desperately wicked;" Prov. xx. 9, "Who can say, I have made my heart clean?" James iii. 2, "In many things we offend all;" 1 John i. 8, "If we say that we have no sin, we deceive ourselves." Many, very many other texts might be added.

Upon further consideration, the cause of this error became distinctly marked to my mind, and I could not but say to myself, Does not this arise from the disbelief of the doctrine of original sin, from forgetting that "that which is born of the flesh is flesh," John iii. 6; and "that we are by nature the children of wrath?" Ephes. ii. 3. How much mischief has arisen from this! The writer of that epitaph must have been ignorant of the doctrines of our reformers, grounded on scripture truth, agreeably to which, they spoke of original sin as "the fault and corruption of the nature of every descendant of Adam, whereby man is very far gone from original righteousness, and is of his own nature inclined to evil, so that the flesh lusteth always contrary to the Spirit, and therefore in every person born into the world it deserveth God's wrath and damnation." Here the question is simplified; there is no occasion to sit in judgment on the relative perfection of any party; there is no need to compare one frail mortal with another, and set up a standard of ideal worth, or comparative excellence. Referring to this, there is no room left for fond parents to deceive themselves, or to regard those as cruel who would call their attention to the truth, or to accuse a kind adviser of disparaging what is comparatively excellent and amiable. The danger is shown, and the remedy is not distant.

The advice of the apostle is applicable to all, "Believe on the Lord Jesus Christ, and thou shalt be saved." This is the only way of salvation, faith in Him who died for sinners, the Just for the unjust, that we might be brought near to God. In him alone is there forgiveness of sins, and all have sinned, and come short of the glory of God. The ministers of Christ tell us of this, they deliver their Master's message, they pray us, in Christ's stead, "Be ye reconciled to God. For he hath made him to be sin (or a sin-offering) for us, who knew no sin; that we might be made the righteousness of God in him." 2 Cor. v. 20, 21. It is only when clothed in the righteousness of Christ, that guilty, sinful man can stand with acceptance before the judgment-seat; being made partakers of that righteousness,

> Bold we shall stand in that great day,
> And none aught to our charge shall lay.

Would that every parent and every instructor had these truths deeply impressed upon their minds. How anxious then would they be for the welfare of those committed to their care! how earnest in their endeavours to root out the plants of bitterness! how watchful against their first appearance! and how earnest in their prayers for the influences of the Holy Spirit upon the opening mind! Never would they be called to the bitter agony of watching by the dying couch of a youthful charge, and hearing the last bitter shriek of agony, or the deeply-wounding reproach, that those whose duty it was to instruct, had hid the things of peace from the sufferer's eyes! But let us not dwell on such a painful supposition, though, alas, too often it is realized. And let us be found watchful to impart that knowledge which makes wise to salvation, before the night of death makes it too late.

I know not the history of the individual whose monumental inscription has called forth these remarks. I would readily believe her to have been all that affectionate parents could desire; nay, I would believe her to have been a child of God; still every *true protestant* must realize the title he glories in, and *protest* against the doctrine her epitaph conveys; nay, if she were herself renewed in heart, she would have been most anxious that no such declaration should have been made respecting her; and if she were not of that number, painful thought! she knows its fallacy now.

I have referred to the reformers of the English church, for their views of the scripture doctrine on this subject. Indeed, human authority need not be appealed to, since "it is written;" but I will not close these remarks without giving an apposite quotation from one of the early fathers of the church. Augustine says, "Who shall inform me of the sin of my infancy? For none is clear from sin in thy sight, not even the infant, whose life is only one day. Could it be right in me to solicit, with tears, what it would be noxious to receive? To express vehement indignation against my parents and betters, if they did not comply with my will; and to endeavour, though with feeble blows, to avenge myself upon them? The imbecility of my infant limbs was innocent, not so the spirit of the infant; I have seen and observed an infant full of envy, pale with anger, he looked at his fellow-suckling with bitterness in his countenance. Since I was conceived in iniquity, and my mother nourished me in sin, where, Lord, where, or *when* was I *innocent?*"

A TRAVELLER.

## INSECTS. No. XXXII.

(*Their Expansion.*)

*a* Twenty-plume moth. *b* Ditto magnified.

In the last paper we alluded to the rapid expansion and developement of the wings of insects; we must now explain more particularly the cause in operation. Every wing consists of two membranes, more or less transparent, applied to each other: the upper membrane being very strongly attached to a number of hollow vessels, miscalled nervures; and the lower adhering more loosely, so as to be separable from them. These nervures originate in the trunk; and, with the exception of the marginal ones, keep diminishing gradually to their termination. The vessels contained in the nervures consist of a spiral thread, whence they appear to be air-vessels, communicating with the tracheæ or air-vessel in the trunk. The expansion of the wing, at the will of the insect, arises from a subtle fluid which is introduced into these nervures.

In the pupa, the two membranes, composing the wing, do not touch each other's inner surface, as they afterwards do; there is, therefore, a space between them; and being moist, and corrugated into a vast number of folds, like those of a fan, transversely as well as longitudinally, and so minute as to be imperceptible to the naked eye, the wings appear much thicker than afterwards. Now, as soon as the insect is disclosed, this fluid enters the tubes, and being impelled into their minutest ramifications, necessarily expands their folds, and, as they gradually extend in length, the moist membranes attached to them are also unfolded and extended. In proportion as this takes place, the expanding membranes approach each other; and, at last, being dried by the action of the atmosphere, become one. To promote this action of the fluid, seems the object of the agitations which the animal gives from time to time to its unexpanded wings.

That the injection of an aqueous fluid into these organs, actually takes place, has been fully proved by experiment. The wings of a butterfly have been clipped during their expansion, and then it has been seen, that the nervures were not only hollow, but that, however dry and empty they may afterwards be found, they contained at that time such a fluid.

The blood in the bee, Swammerdam says, when the wing is cut, "appearing, by reason of the extreme smallness of the blood-vessels, under the form of little pellucid globules, which insensibly, and by degrees, increase into considerable little drops. The wings of the bee have likewise many pulmonary tubes; which, when the nymph is casting its last skin, have also, together with all the other parts, once more to throw off their exuviæ or coverings. After this, when these tubes are again distended by the freshly impelled air, and the air-vessels, which have previously been contracted, are inflated and distended with the same air, it follows, that the whole wing afterwards expands itself, and becomes thrice, nay, four times larger than it was before. This expansion of the wings, then, depends both on the impulsion of the air and of the blood; for, at the same time when the air is impelled into the wings, a considerable quantity of blood is likewise driven into the vessels of the wings."

"The female bees," he adds, "do not, as the common bees and the male, come forth with their wings folded up, but expanded and displayed, and in a state ready for flight. On this account, the all-wise

Author of nature has provided for them a more spacious mansion, in which they may expand their wings conveniently and properly; so that, after they have burst from their cells, they may be prepared for swarming immediately, if there be a necessity for it, or if the young queen may be in a condition to drive out her royal mother, and take her place if there be occasion."

Jurine found, that every nervure contains a trachea or air-tube, which, proceeding from the interior of the trunk, in a serpentine direction, follows all the ramifications of the nervures, though it does not fill it. Reaumur attributes the expansion of the wings chiefly to an aqueous fluid; yet, he suspects that the air, on some occasions, contributes to it.

This tubular structure has an interesting analogy in the case of birds. In them, the lungs have several openings, communicating with corresponding air-bags, or cells, which fill the whole cavity of the body, from the neck downwards, and into which the air passes and re-passes in the process of breathing. Nor is this all; the very bones of birds are hollowed out, with the design of receiving air from the lungs, from which air-pipes are conveyed to the most solid parts of the body, and even into the quills and plumelets of the feathers, which are hollow or spongy for its reception.

The expansion of the whole insect is, in some instances, very remarkable. When, for example, the ant-lion is about to change into a pupa, it constructs a cocoon of sand, which it lines with a beautiful tapestry of silk, the whole being less than half an inch in diameter; the pupa itself, when rolled up, filling only a space of about half this size. When it has remained in the cocoon about three weeks, it breaks through the envelope, and emerges to the outside, as the chrysalides of the wood-birds make their way to the exterior of a tree, to facilitate the exit of the perfect insect; with this difference, that the creature, whose operations we are now describing, makes use of its mandibles, or jaws, to gnaw the cocoon. Having arrived at the outside, it only requires to expand its wings and its body, to complete its transformation; but this process is very amazing; for though, on emerging, the creature is not more than half an inch in length, it almost instantaneously stretches out to an inch and a quarter; while its wings, which did not exceed the sixth of an inch, expand to nearly three inches. In another case, the cocoon is not bigger than a small pea, while the body of the fly is nearly half an inch in length, and covers, when its wings and antennæ are expanded, a surface of an inch square.

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## THE ROYAL OBSERVATORY, GREENWICH.

No. II.

(Continued from page 42.)

Doctor Edmund Halley, celebrated as the first astronomer who successfully predicted the return of a comet (in the year 1759) which is now called after his name, and is the same which is expected to return to its perihelion, and become visible to the inhabitants of the earth in a few months, was appointed the successor of Flamsteed; but upon taking possession of the observatory, he had to apply to the government to furnish him with instruments to make observations with, those which Flamsteed had used having been removed by his widow as the private property of her husband, he having in his lifetime defrayed the whole expense of their construction, and in part made them himself, with the help of his assistant, Mr. Abraham Sharpe, with the exception of a few which had been presented to him by his friend and patron, Sir Jonas Moore. After considerable delay, and the government failing in compelling Mrs. Flamsteed to restore at least those which had been the donation of Sir Jonas, a sum of money was granted for the construction of instruments, and an iron-framed mural quadrant was made and erected in 1725 by Mr. Graham, the celebrated clock-maker of that time. A transit instrument, of rather singular construction, was also fitted up; this and the mural quadrant are still preserved at the observatory as astronomical curiosities.

Dr. Halley was born at Haggerstone, in the parish of St. Leonard, Shoreditch, October 29, 1656; he received his early education at St. Paul's school, which he completed at the university of Oxford. At the early age of nineteen, he gave to the world the first of those useful observations and discoveries, which he continued to make to the end of a very long life. In 1676, when only twenty years of age, he proceeded, on his own account, to the island of St. Helena, for the purpose of making astronomical observations in the southern hemisphere, and in the short space of two years, he returned with a large catalogue of stars, which were invisible to astronomers in these latitudes. The university of Oxford immediately conferred on him the degree of A.M., and the Royal Society elected him one of their members.

In the course of his after life he visited several parts of the world for the purpose of scientific experiment and discovery. In 1703, he was appointed professor of geometry in the university of Oxford, and, as before stated, succeeded, in 1719, Mr. Flamsteed as astronomer royal.

Although Dr. Halley had arrived at the advanced age of sixty-three, when he entered upon his office at Greenwich, yet, for the period of eighteen years, he watched the heavens with the closest attention, hardly ever missing an observation during all that time, and, without any assistant, performed the whole business of the observatory himself.

During this period, an offer was made him of being appointed mathematical preceptor to the Duke of Cumberland, but he declined that honour, on account of his advanced age, and the duties of his office.

About the year 1737, he was seized with a paralytic disorder in his right hand, which gradually increasing, his strength wore away, and he expired on the 14th of January, 1742, in the eighty-sixth year of his age. His remains were interred in the church-yard of Lee, near Blackheath.

The third astronomer royal was Dr. James Bradley, of Sherborne, in Gloucestershire, at which place he was born, in the year 1692.

He was admitted a commoner of Baliol College, Oxford, March 15, 1710; where he took the degree of bachelor, October 14, 1714, and master of arts, the 21st of January, 1716. Being designed for the church, he was ordained, at the proper age, by the bishop of Hereford, who gave him the living of Bridstow, and shortly afterwards he was inducted to that of Landewy Welfry, in Pembrokeshire.

Mr. Pound (the celebrated astronomer) was the uncle of Mr. Bradley, with whom, at his residence at Wanstead, he passed as much time as he could spare from the duties of his office. Here he made such astronomical observations as laid the foundation of those discoveries which afterwards distinguished him as one of the greatest astronomers of his age; these observations gained him the notice and esteem of the learned of that day, and led to his being elected a fellow of the Royal Society.

When only twenty-nine years of age, Mr. Bradley was elected Savillian professor of astronomy at Oxford, upon which he resigned his church livings, and applied himself wholly to the study of his favourite science. In the course of a long series of observations upon the fixed stars, with a view to determine the amount, if any, of their annual parallax, he discovered and settled the laws of the apparent alteration of their positions, arising from the progressive motion of light, combined with the earth's annual motion about the sun, and the nutation of the earth's axis, arising from the unequal attraction of the sun and moon on different parts of the earth. The former of these splendid discoveries, which is termed the aberration of the fixed stars, he made public in 1727, and the latter in 1737; so that in the space of ten years, he communicated to the world two of the finest discoveries in modern astronomy; making a memorable epoch in the history of that science.

His appointment as successor to Dr. Halley, was dated February 3, 1742. This placed him in his proper element, and he pursued his observations with unwearied diligence. In addition to the instruments already at his command, he obtained from the king a grant of one thousand pounds, to be expended in procuring others of the best kind. An additional mural quadrant, by the celebrated Mr. Bird, was at this time erected, which still occupies the eastern face of the pier, which carries the iron quadrant of Graham, before spoken of, also the famous zenith sector, with which he made the above grand discoveries, is preserved in the same room with the quadrants.

Upon his appointment to the observatory at Greenwich, the university of Oxford sent him a diploma of doctor of divinity, and during his residence there, the living of the church of Greenwich became vacant, and was offered to him. Upon his refusing to accept it, from a conscientious scruple, "that the duty of a pastor was incompatible with his other studies and necessary engagements," the king granted him a pension of two hundred and fifty pounds per annum, in addition to his salary as astronomer royal; which pension has been continued to each of his successors.

By too close application to study and observations, Dr. Bradley became afflicted, for nearly two years before his death, with a grievous oppression on his spirits, which interrupted his useful labours. He died on the 13th of July, 1762, at Chalfont, in Gloucestershire, in the seventieth year of his age, and was interred at Minchinhampton, in the same county.

At his death, his observations filled thirteen folio volumes, which were presented to the university of Oxford, in 1776, on condition of their printing and publishing them, which has only been very recently accomplished.

### THE GOSPEL.

The same power which the gospel has to save, it has to destroy. It increases the condemnation and misery of those who reject it, and it were far better never to have heard its gracious invitations, than, having heard them, to cast them voluntarily away. To this destroying power of the gospel, to those who reject it, Jesus refers when he says, "Whosoever shall fall on this stone shall be broken; but on whomsoever it shall fall, it will grind him to powder." It has an irresistible energy. It comes with an overwhelming force upon those who have despised its mercies, and makes it better for such persons if they had never been born. This gospel must appear in the great day, as a witness for or against every child of man. It will bear testimony for all who have accepted its invitations, that justice is satisfied, and all condemnation must pass away; that the Lamb is worthy, to whom infinite honour and glory must be ascribed. It must witness against all who have refused its mercies, that they are without hope; the law must take its course, while their condemnation and ruin have been awfully increased, by choosing death rather than life. With a destructive weight it falls upon such, to grind them to powder, to consign them over to everlasting ruin, and bind them in chains of eternal darkness and death.—*Dr. Tyng.*

### SPECIFIC GRAVITY.

The idea of specific gravity, or that relation which arises from comparing the weight of a body with its bulk, did not originate with Archimedes, who was killed at the sacking of Syracuse, B. C. 212, as some would seem to suppose; for we find an implied allusion made to it by Hippocrates, to whose skill Athens owed so much, during the plague that began B. C. 430, in his treatise concerning airs, waters, and places, which was published at Paris, in 1800, by Corcey, with a translation, long notes, and a preliminary dissertation in French.

In this treatise, Hippocrates, near the beginning, after recommending us, in judging of the comparative salubrity of different places, to pay particular attention to the virtues or properties of the waters, says, that as the virtue or peculiar property of each differs from that of any other part, just so they differ in taste, and in weight: *ἐν τῳ στοματι καὶ ἐν τῳ σταθμῳ*; literally, "in the mouth and in the balance."

And without question, the great physician wished us to understand, that the waters of different places were to be meted and weighed in some unvarying measure; suppose, for illustration, an attic xestes, or about an English pint.

As the specific gravity of different bodies is often referred to, it is important that the reader, who is fond of philosophical researches, should have a distinct idea of what is meant by it.

The following short definition will convey the idea as it was understood by Hippocrates:—Specific gravity is the weight of some constant magnitude taken as a standard.

Let the constant magnitude to be assumed as the standard, be the imperial gallon, which weighs ten pounds avoirdupois, when filled with pure water. Call ten pounds the specific gravity of water. If the same unvarying measure be filled with aqua fortis, we shall find its weight to be thirteen pounds, which will be its specific gravity. The measure itself is supposed to be without weight, as in practice it must be balanced before the liquid is introduced.

Again, let us suppose, that Hippocrates used the xestes, or attic pint, and finds that when filled with the purest water, it weighs twenty ounces avoirdupois, and that another kind, impregnated with mineral substances, weighs twenty ounces and a half. Then he might have called twenty ounces, and twenty ounces and a half, their specific gravity respectively.

"The specific gravity of a body is its weight, compared with the weight of another body, whose magnitude is the same."—*Vince.*

This definition differs in appearance from the one given above; but if we have made ourselves understood in explaining what we apprehended to be the original notion, the reader will be prepared to understand it.

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### RELICS.

The christian traveller who visits the monastery of Great St. Bernard, cannot but be deeply pained to see the worship that is paid in the chapel belonging to this establishment, to the waxen figure of a young woman, richly dressed, and contained in a glass case, the frame-work of which glitters with gold and jewellery. Nothing can exceed the earnestness of the priest who conducts this worship; his expressions of respect, faith, and love, are most numerous and varied. This waxen image contains some bones said to have belonged to a noble Roman lady, named Faustina, who suffered martyrdom under the reign of Nero!, A well-worded certificate declares these relics genuine! They were purchased at Rome by a man who holds a high situation as a member of the Reformed Church of Switzerland. He presented them to this chapel, and the Pope paid the expenses of the statue and case. This may remind us of the conduct of those Europeans, who have lately made, and sent into India, images of the idols worshipped there, and who thus contribute to strengthen the stupid and barbarous idolatry, which the missionaries of the gospel are labouring to abolish at the peril of their lives. It is not, however, probable, that the Swiss gentleman would be well satisfied with the effects produced by his present, if he were to witness the devoted idolatry which he has occasioned. His conscience, perhaps, would remind him, that he will one day be called to give an account of it before the tribunal of the living God, who has declared, that He will not give his glory to another. Who knows what will be the end of this impious worship, which has now existed two or three years? Who can tell how many souls it may be the means of leading from the paths of truth, to perish in the way of deceit? It has been particularly noticed, that this newly set up image attracts the notice and fervent adorations of many of the pious travellers who pass that way.—*Archives du Christianisme.*

### HUMILITY.

Pray much for the spirit of humility, the spirit of Christ, for that is it; otherwise, all thy vileness will not humble thee. When men hear of this or of other graces, and how reasonable they are, they think presently to have them, and do not consider the natural enmity and rebellion of their own hearts, and the necessity of receiving them from heaven. And therefore, in the use of all other means, be most dependent on that influence, and most in the use of that means which opens the heart most to that influence, and draws it down upon the heart; and that is, prayer.

That spirit of Christ, which is all sweetness and love, so calms and composes the heart, that peace with God, and that unspeakably blessed correspondence of love with him, do so fill the soul with lovingness and sweetness, that it can breathe nothing else. It hates nothing but sin, it pities the sinner, and carries towards the worst the love of good will, desiring their return and salvation. But as for those in whom appears the image of their Father, their heart cleaves to them as brethren indeed. No natural advantages of birth, of beauty, or of wit, draw a christian's love so much, as the resemblance of Christ; wherever that is found, it is comely and lovely to a soul that loves him.—*Leighton.*

### ANTICIPATION OF THE JUDGMENT.

Strange things await us in futurity. A wonderful developement is to be made at the bar of God. Our associations in life, our social dependencies, our domestic relations;—what numerous, what diversified, and what deep-tending issues are to arise from them all! It is, when we view the judgment-seat through the medium of such thoughts as these, that it assumes its most characteristic usefulness. It is when we extend our eye through the far-stretched line of consequences. It is not the individual commission of sin, it is not the perpetration of personal iniquity, painful as this is, which makes up the most appalling anticipa ion of the awaiting decision. It is the influence we have had, and the part we have taken, and the example we have set in the affairs of immortal souls; it is the far-reaching result through them in their turn again. We shall never understand how consequences multiply, until we behold them examined before the throne of the heavens. —*Dr. T. C. Henry.*

Sin.—He that hath slight thoughts of sin, never had great thoughts of God. Psa. l. 21.—*Owen.*

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# THE WEEKLY VISITOR.

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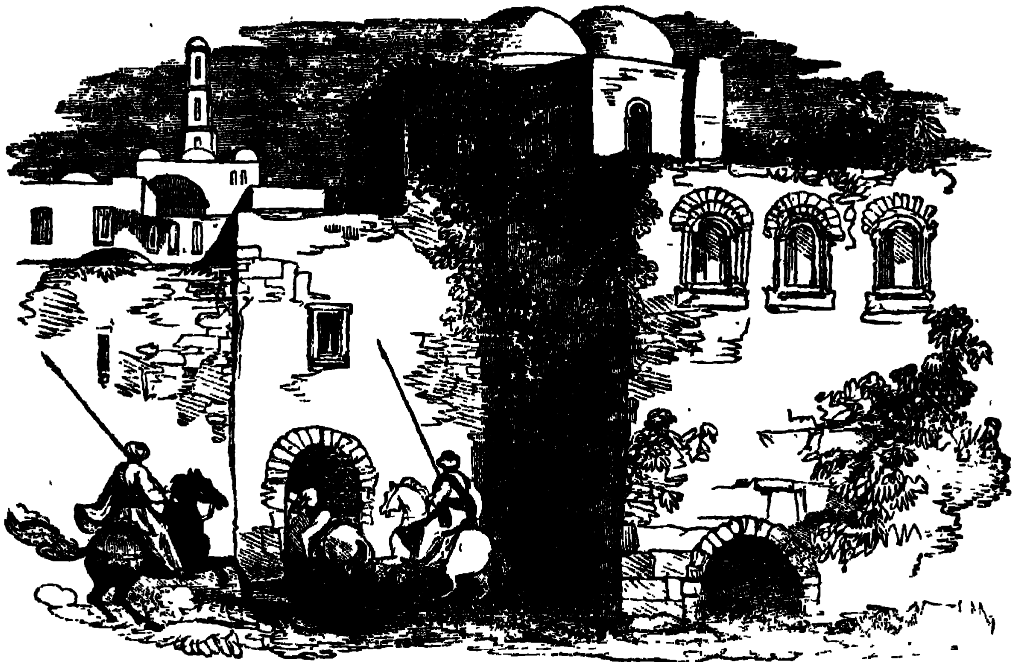

EASTERN GATES.*

## SCRIPTURE ILLUSTRATIONS.—No. XIII.

"He that exalteth his gate, seeketh destruction."*
Prov. xvii. 19.

To the inhabitants of Europe, the language of this proverb is by no means intelligible. Matthew Henry, who lived before oriental customs were so well understood as they now are, has given the probable spirit of this passage; but its striking allusion was evidently unknown to him. He says, "Those that are ambitious and aspiring, expose themselves to a great deal of trouble, such as many times ends in their ruin. He that exalteth his gate, builds a stately house, at least a fine frontispiece, that he may overtop and outshine his neighbours, he seeks his own destruction, and takes a deal of pains to ruin himself; he makes his gate so large, that his house and estate go out at it." The moral which Matthew Henry seems to deduce from this proverb is, that extravagance leads to ruin. Perhaps it should rather be, that the most humble are the most safe. The Arabs are accustomed to ride into the houses of those they design to harass, as they seldom dismount in their attacks. To prevent this, Thevenot tells us, that the door of the house in which the French merchants lived at Rama, was not three feet high, and that all the doors of that town were equally low. Agreeably to this account, the Abbé Mariti, speaking of his admission into a monastery near Jerusalem, says, "The passage is so low, that it will scarcely admit a horse; and it is shut by a gate of iron, strongly secured in the inside. As soon as we entered, it was again made fast with various bolts and bars of iron, a precaution extremely necessary in a desert place, exposed to the incursions and insolent attacks of the Arabs."—Travels through Palestine, vol. iii. page 37. The same illustration we may derive from the customs of the Persians. Morier says, "A poor man's door is scarcely three feet in height; and this is a precautionary measure to hinder the servants of the great from entering it on horseback; which, when any act of oppression is going on, they would make no scruple to do. But the habitation of a man in power is known by his gate, which is generally elevated in proportion to the vanity of its owner. A lofty gate is one of the insignia of royalty. It must have been the same in ancient days; the gates of Jerusalem, Zion, &c., are often mentioned in scripture, with the same notion of grandeur attached to them." From these illustrations, it is evident to what the writer of the proverb alluded; and to exalt the gate, would consequently be to court destruction. J. C.

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## CHEMISTRY.—No. IV.

### SIMPLE SUBSTANCES—OXYGEN.

THOSE bodies which are found, on close examination, to be composed of only one kind of matter, are termed simple substances, and are, consequently, the elements from which all other bodies are formed. Substances that contain two or more of these elementary principles, are designated compound bodies. Through the labours of Sir Humphrey Davy, and other eminent chemists, many substances that had always been considered simple, have been decomposed, and proved to be compounds; and it is highly probable, that future discoverers will analyze some of the substances now included in the class of simple bodies.

There are now about fifty substances that are considered by chemists to be simple; oxygen, nitrogen, hydrogen, chlorine, iodine, the various metals; carbon, phosphorus, sulphur, boron, and fluorine. It is not intended to treat upon the distinct properties of all these substances in this precise order, though each of them will receive some consideration in the subsequent remarks.

OXYGEN is one of the most important substances that fall under the notice of the chemist. It is an energetic and powerful agent, acting an important part in almost all the changes that take place in the mineral, vegetable, and animal kingdoms. When united with light and heat, it forms oxygen gas. This gas is colourless and invisible. It is also permanently elastic, or subject to great expansion and compression, though incapable of being condensed into a fluid or solid. It is the chief supporter of combustion. If a lighted candle be placed in a jar containing this gas, it instantly burns with vastly greater brilliancy and splendour. This gas is the basis of atmospheric air, and the supporter of life. When inhaled in a pure state into the lungs, it has the effect of raising the pulse, and increasing the motions of the animal fluids. It has sometimes been termed vital air, from the well-established fact, that no animal can breathe for a moment where there is no oxygen. It is 740 times lighter than water, but somewhat heavier than atmospheric air. Oxygen is one of the principal agents in promoting the numberless processes of decomposition that are continually taking place in nature. Many interesting and instructive experiments may be performed with oxygen gas, and there are several methods of procuring it. We will describe two of the most simple. Procure some fresh green vegetable leaves, and place them in a bell glass filled with water, then invert the glass over a flat dish, also filled with water. Expose the whole to the rays of the sun, and the gas will be formed, and ascend in bubbles to the top of the glass, displacing the water. Another mode of obtaining this gas is the following:—Procure a Florence flask, and put into it a small quantity of the black oxide of manganese, reduced to a powder, (an article which may be purchased of any chemist,) and a sufficient quantity of sulphuric acid to wet it thoroughly, and let them be well mixed together. If the flask be then exposed to the heat of a small lamp, oxygen gas will ascend, and may be received into another bottle, in which it may be preserved for use. The first air that rises is common air contained in the flask, and should be permitted to escape.* Oxygen enters into combination with such a variety of other substances, and will be so frequently brought under our view, that its properties need not for the present be more fully detailed.

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* The collecting of gases being sometimes attended with difficulty, we will describe a simple method mentioned in Donovan's Chemistry.—"In order to collect a gas, let a glass bottle be filled to the top with water, and cork it so that the cork having excluded its own bulk of water, the bottle remains full. The bottle from which the gas is to come, and the vessel of water, should be previously so arranged, that the end of the tube of the bottle can be plunged under the surface of the water. The gas will bubble up through the water; the first portion will be common air, expanded by heat. When this has been allowed to escape, slip the mouth of the glass bottle over the end of the tube, so that the bubbles of gas may enter the bottle. In proportion as gas enters, water will leave the bottle: and when it is filled with gas, put in the cork and remove it; or, without putting in the cork, pass a cup into the water, under the mouth of the bottle, and remove both bottle and cup, the latter remaining filled with water, so as to prevent gas from escaping or common air entering. Other bottles may then be filled in succession. The most convenient vessel for holding water for these purposes, is a trough or cistern of wood or japanned tin, with a shelf, about two inches under the intended surface of the water, for supporting jars or phials while they are filling with gas. This vessel is called the pneumatic trough."

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### OLD HUMPHREY ON OCCUPATION.

If I were asked, What tends most to mitigate earthly sorrow, with the exception of the comfort derived from divine things? I should unhesitatingly reply, Occupation.

Yes! occupation cures one half of life's troubles, and mitigates the remainder. It matters not of what kind they may happen to be: troubles always appear great, and our own cares are invariably greater than those of our neighbours; but whether we are afflicted in mind, body, or estate, occupation is the best prescription we can take.

Suppose you have had a loss, say it is five silver shillings, or as many golden sovereigns; nay, let it be, if you like, a hundred pounds, or a thousand, for it is not the amount of our losses that weighs down our spirits, but our real or fancied incapability of bearing them—suppose you have had a loss, I say, why all the sighing and the sorrowing, the moaning and repining in the world, will not bring back a single sixpence of your money again, though it may disqualify you for making an attempt to recover your loss. You may get friends to condole with you, and make your loss greater by losing your time in brooding over it, but occupation is the only thing to relieve you. It is the most likely of any thing to make up your money again, and if it do not that, it will engage your mind as well as your fingers, and keep you from despondency.

Suppose your body is afflicted; will sitting or lying down doing nothing, with your dejected eyes fixed on the wall—will this, I say, pull out a thorn from your finger, or assuage the pain of an aching tooth, or cure a fit of the gout? Not a bit of it. So long as pain does not deprive you of the power of occupying yourself, occupation will be for you the best thing in the world. Let it be suited to your condition, and persevered in with prudence. A weak body cannot lift a heavy burden, nor a confused head think clearly; but do something, whether it be much or little, hard or easy, so long as you can write a letter, wind a ball of cotton, make a spill, read a book, or listen while another reads it to you, so long as you can do any of these things, you will be mitigating your affliction.

In like manner, if your mind be wounded, apply the same remedy. If your enemy has injured, or your friend deceived you; if your brightest hopes have been clouded, or your reputation blackened, pray for your enemies, and then, up and be doing! Better gather field-flowers, plait rushes, weed the garden, or black your own shoes, than be idle. Occupation will raise your spirit, while idleness will bring it down to the dust. Occupation will blunt the edge of the sharpest grief, keep the body in health, and preserve the mind in comparative peace.

He that is in trouble, must do something to get rid of it.

I have known many a man get to the top of a mountain by resolutely clambering up its rugged sides, who would never have got there at all by sitting down and fretting at the bottom of it. And, many a hardy swimmer has crossed a rapid river, by sturdily buffeting its rushing waters, who never could have achieved such an adventure, by despondingly allowing himself to be carried along by the current: something must be done, and done by yourself too, when you are in trouble; or otherwise, it will stick as close to you as the skin that covers you. If I had not been a man of occupation, my heart would have been broken long ago. I never could have stood up under the load of troubles, that God, in mercy, has given me strength to sustain. Old Humphrey is always occupied; his tongue, his hands, his head, or his heels, are in continual requisition; and, rather than sit down and do nothing, he would willingly break stones on the highway, make brimstone matches, and hawk them about from door to door.

Time flies rapidly with those who have more to do in the day than they can accomplish; and drags along as heavily with all who have no employment to occupy their hours. Occupation is the great secret of cheerful days and tranquil nights; for he that is well employed while the sun is in the skies, will most likely sleep soundly when the stars are shining above him.

The moment you feel yourself getting moody and miserable, seek Divine support by prayer, and then set yourself a task immediately; something that will occasion you to exert yourself, and you will be surprised at the relief it will afford you.

Though old Humphrey advises you to do something of a trifling nature, rather than be idle, he is no advocate for trifling.

So long as this world endures, there will always be employment enough and to spare, for all those who either wish to guide others to heaven, or to get there themselves. If you cannot employ your body, employ your mind; for, there is a time to employ it profitably;

> A time to reflect on our words and ways;
> A time to pray, and a time to praise.

And especially employ yourself in doing good, and mitigating the sorrows of others: while taking a thorn from the bosom of another, you will lose that which rankles in your own.

Thousands, who know how much comfort occupation gives, do not know how much distress and uneasiness it keeps away. Show me two men, who have equal advantages,—one of them idle, and the other fully occupied, and I will venture to pronounce the latter ten times happier than the former. Care is a sad disease, despondency a sadder, and discontent, perhaps, the saddest of them all; but, if you wish to be cured of all these together, next to seeking Divine support, my prescription is—OCCUPATION.

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### BOTANY.—No. III.

### ORDER—ARALIACEÆ.

OF the shrubs and plants which are associated under the general term of araliaceæ, the ivy may serve as a good sample. With this well-known garniture of old walls, the eyes of all persons are familiar; no botanical description is necessary to enable our friends to distinguish it from others. The presence of an umbel of flowers, which when ripe produce berries, is the chief characteristic.

If we examine the ivy, which flowers in winter, we see that the flowers are in a little cluster; that several smaller flower stalks rise from a single point in the stem, which distinguishes the umbel from all other modes of flowering. If we look at the figures of the moschatel and gin-seng, we remark that the blossoms rise from a single point. This attention to punctilious niceties about the position of a blossom, may appear uninteresting to the general reader, but amidst the ever-increasing variety of vegetable objects, we eagerly grasp any means of throwing them into assortments, to relieve the memory and assist the judgment.

In the umbelliferous order several hundred plants are most conveniently assembled under one head; consisting of the celery, parsley, carrot, parsnip, coriander, caraway, fennel, hemlock, &c., and are all of them most readily characterized by their mode of flowering, and the nature of the fruit which finally separates into two seeds. Among these plants, the Creator has taught us to establish orders, for they are impressed with marks of resemblance, that the most incurious cannot fail to recognise when pointed out to him. But in the araliaceæ the same strong and evident relationship is not found between the several plants that belong to it, which there is among the umbelliferous plants, but we find a resemblance in the mode of flowering, besides the various instances of agreement which are met with in blossom and fruit. The reader should know, that he can never understand this science without studying the plants themselves: they will give most instructive lessons, and accompany their precepts with many pretty stories of their history; while they silently set forth the wisdom and goodness of their Creator. In old times, it is fabled that Orpheus, by the music of his lyre, brought trees from mount Hæmus to the shores of the Ægean: in these days the fable is reversed; for men, when smitten with the love of botany, are led by trees and plants to encounter the perils of robbers, famine, and wild beasts, for the single object of gaining a knowledge of their history and properties. But we do not invite our readers to join us in such wild excursions: we only bid them fetch a flowering branch from the ivy; in doing which they will neither have to be hauled on shore, through a raging surf, nor find themselves exposed to the hug of a raging bear. When they are thus provided, let them sit down some odd half-hour, and leisurely compare the following description of each part, with the corresponding stalk of the flower and fruit; and if they do not find more instruction in this single examination and study, than they ever did in all their reading about plants before, let them never take the advice of a botanist again as long as they live. It is very pleasing to look at a beautiful figure, and read a well-told tale about the curious plant it represents, but if we would gather a few grains of genuine botanical science, they must be obtained from the plants themselves.

*Calyx:*—A tube growing to the germen, the border or upper edge either entire or divided into teeth. In the ivy, five minute purplish scales may be seen, at the upper edge of the calyx; each scale is placed just at the point where two adjacent petals separate.

*Petals,* from five to ten, alternating with the little teeth of the calyx. The segments of the calyx are said to alternate with the petals, when the middle of the segment of the calyx coincides with the edge of the petal. In the ivy the petals are broad at the base, and have the medial line raised and sharp. By means of this elevated line, two adjoining petals, before they expand, form a little cavity to afford a lodgment for the anther. The reader will be surprised at the exactness with which the anther fills the niche that has been thus provided. To perceive it, he has only to take a neighbouring pair of petals off without separation.

*Stamens*, generally equal in number to that of the petals. In the ivy, they are greenish, and broad at the base.

*Anthers*, attached to the tapering filament, by their middle. From this circumstance, and the roundness of their forms, they are said to be peltate or target-shaped.

*Germen*, growing to the calyx. If, after abstracting the corolla of the primrose, we withdraw also the calyx, we shall see that the germen is not affected by the removal of the last organ. But, in the ivy, the outer covering, which is a continuation of the little scales before described, is one with the coating of the germen. This fact is worth attending to, for it connects this order with the umbelliferæ, wherein the calyx is in the same predicament, in reference to the germen.

*Cells*, in the germen, varying in number, from two to several. These vary in the same plant; in the ivy, for example, we sometimes meet with five, but more frequently with only three. The history of this deviation in the number of cells appears, from our observation, to be this; one or two of the seeds, by their overgrowth, appropriate all the nutriment; hence their less favoured brethren, being deprived of their necessary support, either disappear altogether, or are seen in a very stinted and diminutive condition. No cell has more than one seed within it.

*Styles*, several, either distinct, diverging, or united into one. In the ivy they are short, and collected into one apparently simple style; but if we cut it horizontally, and place it under a magnifier of about half an inch focal length, we shall perceive that it is compounded of several. Each style is a tube, and these tubes are obvious to the assisted eye, and may easily be traced down into the germen.

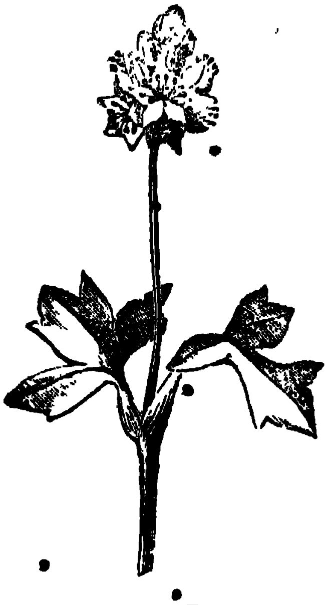
*Stigma*, simple, and forming an undivided head to each style. If we look at the top of the united style in the ivy, with a magnifier, we discern four or five minute prominences upon it; each of these we must consider to be a stigma.

*Berry*, which is the ripened germen, has from two to fifteen cells, corresponding in number with the divisions of the calyx, each cell containing only one seed.

*Seeds*, angular, erect, with a perisperm or outer covering, that becomes crustaceous when the berry is ripe. The texture of any thing is said to be crustaceous when it is hard, and, when broken, the edges of the fracture appear to be composed of minute grains.

EXAMPLES.

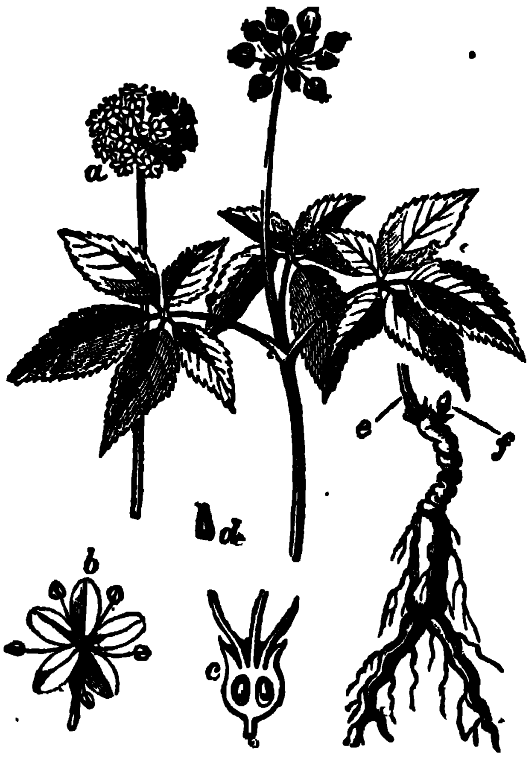
*Adoxa.*—Tube of the calyx growing to the germen, leaving its margin divided into four or five lobes, which are of an oval form. Petals, five. Stamens varying from eight to ten; some of them are alternate with the segments of the calyx; for this reason they are presumed to be transformed petals, while others are opposite to the segments, that is, in their regular position. Styles, four or five; thick, and distinct from each other; their separation commences at the top of the germen. Berry, four-celled and four-seeded. Seeds, each furnished with a membranous margin. Root covered with scales.



ADOXA MOSCHATELLINA.

*Adoxa moschatellina.*—Tuberous moschatel. Not unfrequent in groves and thickets, and shady lanes, flowering in April or May. The generic name adoxa, inglorious, very aptly expresses the modest and unassuming appearance of this little plant, as it emerges from its wintry bed of withered leaves, to greet the botanist in his herborising excursions in early spring. When young, and moist with dew, it has a faint smell of musk. The root is perennial, and is composed of fleshy imbricated (tiled) scales, from which the fibres are produced, as well as the runners, which terminate in fresh roots. Herb, pale green, succulent, smooth, and pellucid. Stem, three or four inches high, angular, having two opposite leaves, some distance below the flowers. Flowers, five in a head, greenish. Fruit never found ripe.

*Panax*. Calyx divided into five teeth. Corolla with five petals; stamens, five; styles, two. It would seem, however, as if three were the regular number, becoming twain by a deficiency of growth, since in some specimens of the gin-seng three are found, a circumstance which we have taken care to mark in our figure. Probably, in most instances, an inquisitive search would discover some traces or rudiments of a third. Berry, nearly heart-shaped, with an umbilicus, or scar, upon the crown; cells, two.



PANAX QUINQUE FOLIUM GIN-SENG.

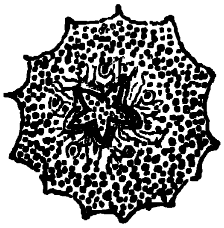
*a* Barren Flowers. *b* Barren Flower.
*c* Fruit. *d* Embryo. *e* Stem.
*f* Bud of Stem for following year.

*Panax quinquefolium gin-seng*—or, as it is spelt in Dr. Morrison's dictionary, Jin-san. The latter syllable seems to be the name of the plant, while the former, which signifies man, is added, perhaps, to denote its excellence. Stem is simple, and terminating in an umbel of flowers, which is supported by an involucre of fine leaflets. It is furnished, at some distance below the flowers, with three leaves, which are divided into fingered leaflets. The fertile and barren flowers are upon distinct individuals. The root is spindle-shaped, and commonly cleft into two branches. The gin-seng, so renowned for its restorative virtues among the Chinese, was long supposed to grow only in Chinese Tartary, affecting mountainous situations, shaded by dense woods. But since 1704, when M. Sarrasin, for the first time, transmitted specimens of this plant to Paris, it has been discovered in Canada, Pennsylvania, and Virginia, by Latifeau and others, from whence it is now actually imported into China, and called yang-san, or doubtful, gin-seng.

*Hedera.*—Calyx, margin elevated or toothed; petals, from five to ten, adhering by their tips; stamens, from five to ten; styles from five to ten, united into one; berry, with from five to ten cells.

*Hedera helix*. Common ivy.—Leaves, heart-shaped, with angular lobes; foot-stalk of the leaf compressed into a roundish keel at the base, with the appearance of being gathered into wrinkles upon the part of the stem just below it. There is a peculiar turn in the foot-stalk, so as to render the plane of the leaf nearly parallel to the direction of the stem. If the fruit be pressed, after the falling of the petals, a number of minute drops of transparent liquor will be seen upon the fleshy crown, and studding the little valleys into which it is hollowed.

If the fruit at this stage be taken, a part of the crown cut off, and then a thin slice be shaved off with a razor, and the piece thus removed be submitted to a magnifier of one-eighth of an inch focal length, an appearance, of which we here give an imperfect delineation, will present itself. In the centre is seen a continuation of the five united styles, forming a central column. Immediately surround-



ing it is a cellular substance, full of large openings, perforated by five tubes, or rather, masses of fine cellular substance, with a tube in their centre, communicating with the style and the seed. At a distance from them, and towards the margin, are numerous tubes, which, it would seem, give passage to the clear transparent liquor, that oozes out when the fruit is pressed.

### THE RESOLUTIONS OF THE PENITENT.

"I WILL arise, and go to my father!" Luke xv. 18. With a soul in such danger, with such a God and Father, such a Saviour, so great a salvation offered, I cannot hesitate, I must, I will go: I will take with me words: I will say in secret to Him who seeth in secret, Great and glorious God, pity a vile sinner! Lo! I bring thee a perverse heart, I lay before thee a gift which I myself abhor: yet look upon this loathsome thing; have compassion upon this guilty soul! 'Father, take it: Jesus, present it: cleanse it first in thy own blood, create it anew by thy Spirit, transform it, chasten it, do with it what thou wilt, only pity, pardon, save my poor soul! Repentance begins before saving faith, yet is improved and deepened after it, and by it. Let us go, and in secret humble ourselves before God, thankfully acknowledging repentance as a gift, and earnestly praying for grace that we may bring forth fruits meet for repentance.

Brethren, there is joy in heaven over one sinner that repenteth. Has there been, shall there be joy, over you? If angels pause upon their golden harps, to make silence for music sweeter than their own, it is when the sorrowful sighing of a soul repenting ascends to the ear of God, through the mediation of Christ. Have you given them that joy? If Jesus, surrounded as he is with praises, and glorious in happiness, feels a new satisfaction thrill his sacred bosom, it is when he again sees of the travail of his soul, in another sinful soul repenting at the view of God, presented in his cross. Has he that satisfaction in you? Is yours the soul repenting? I leave that question on your conscience.—*Hambleton.*

DIVINE MERCY.—Men's sins are innumerable, yet they are but cyphers to the vast sums of grace which are every day expended, because they are finite; but mercy is infinite. Rom. v. 20, Ps. ciii. 17. —*Charnock.*

### THE ROYAL OBSERVATORY, GREENWICH

No. III.

(Continued from page 55

UPON the demise of Dr. Bradley, the appointment of astronomer royal was conferred upon Mr. Bliss, who survived it but two years; and, in 1765, he was succeeded by Dr. Nevil Maskelyne, a first-rate astronomer and mathematician of his day. He was born in London, in 1732, and very early made considerable progress, both in his classical and scientific pursuits. In 1758, he was elected a fellow of the Royal Society, and soon after was appointed to go to the island of St. Helena, to observe the transit of Venus over the sun's disk, on June 6, 1761; which was to determine the important point relating to the sun's parallax, and consequently its distance and magnitude, and hence that of all the other planets. The day there unfortunately happened to be cloudy, which prevented the necessary observation from being made; but other astronomers were more successful, and, therefore, nothing was lost, except the confirmation that it would have added to the other results. It was during this voyage that he practised the lunar method of finding the longitude at sea, which he afterwards promoted to the utmost of his power by the publication of the Nautical Almanack, which owes its origin to his recommendation and advice. He published the British Mariner's Guide, and many very valuable astronomical tables, besides making a vast number of observations of the heavenly bodies, during a period of forty-six years, in which he held his important office. He died on the 9th of February, 1811, having discharged the duties of his situation with the greatest credit to himself, and much honour and advantage to the scientific interests of his country.

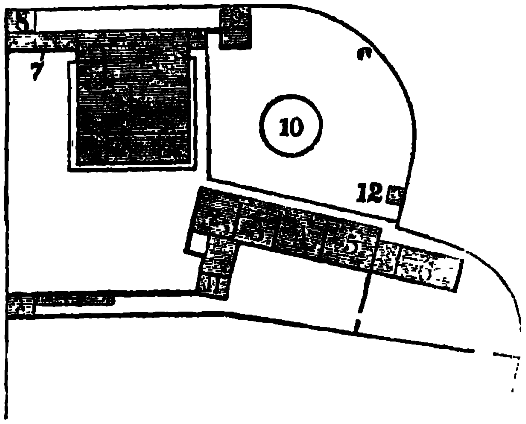
Mr. Pond, the present highly esteemed astronomer royal, was appointed the successor of Dr. Maskelyne. This highly accomplished gentleman, at the commencement of the present century, was possessed of a very superior altitude and azimuth instrument, the construction of that justly celebrated artist, the present aged Mr. Troughton, which was set up at Westbury, where Mr. Pond formed a catalogue of the principal fixed stars; perhaps the best, next to the present Greenwich catalogue, that ever was made. Upon comparing this catalogue with that of the same stars observed at Greenwich with the old mural quadrants, made by Graham and Bird, before spoken of, he was led to the inference that those instruments had changed their figure, that is, they no longer remained true arcs of circles; hence they gave results, to a certain extent, erroneous. This important discovery justly obtained him celebrity as a practical astronomer, and led Mr. Troughton, in considering of a remedy for the evil, to propose an entirely new instrument for astronomical purposes, which would not be liable to the same objection. This was the mural circle, a truly magnificent instrument, the first of which was set up at the observatory, in 1812. Since which time, another has been added, at the suggestion of Mr. Pond, who has invented a beautiful mode of combining the results of the two instruments, by which their errors for each night's observations are given by the observations themselves, and hence a true result can be obtained.

Mr. Pond, ever desirous of promoting the real interest of astronomy, obtained, in 1817, a splendid transit instrument, by the same eminent maker, to be substituted for the old one used by his predecessors, which, together with a zenith micrometer, of twenty-five feet focal length, erected a few months since, enables us to boast the fact, that our national observatory possesses the most perfect set of meridional instruments of any observatory in the world. On the transit instrument is fixed a plate, with the following inscription:

"To the President and Council of the Royal Society, this, and the mural circle, being his greatest and best works, are dedicated by the maker."

In the autumn of 1833 was set up, on the eastern turret of the central building, a ball, five feet in diameter, which is contrived to slide up and down a perpendicular mast; and by the aid of some machinery, is let fall from the top of the mast at the moment of ONE o'clock every day. This being done with the greatest possible exactness, communicates to all lookers-on the correct time, and so instantaneous, that captains of ships within sight of the Observatory of Greenwich, may, previous to their sailing, by daily observation, determine with great accuracy the error and rate of their chronometers, which is of the utmost importance to them; this being the means by which they generally determine the position of their ship, when traversing the pathless waters. In our next and concluding paper, we purpose introducing an engraving of the ball, and the apparatus by which it is put in action, also a representation of the principal instruments of the observatory, with such particulars as will enable our readers to form some idea of their use and method of employing them.

We shall conclude this paper with the following references to our engraved plan of the royal observatory.



1. The residence of the astronomer royal.
2. The room containing the mural quadrants and the zenith sector of Dr. Bradley, spoken of at page 54.
3. The calculating room.
4. The room containing the new transit instrument, the two former ones, namely, that used by Dr. Bradley and Dr. Maskelyne, as well as the one used by Dr. Halley, are fixed against the wall in the same room, and kept, like the instruments in No. 2, as astronomical curiosities.
5. The room containing the two mural circles.
6 The library, containing an extensive and choice collection of philosophical works.
7. The room containing the new zenith micrometer, of twenty-five feet focal length.
8. The western dome, containing an old equatorial, by Jonathan Sisson, now kept as a curiosity.
9. The eastern dome, containing Sir G. Schuckburgh's equatorial.
10. Ramage's twenty-five feet reflecting telescope, constructed upon the same principle as Sir W. Herschel's forty-feet telescope, at Slough, near Windsor.
11. The room called the advanced building, where telescopes are kept for observing eclipses, occultations, &c.
12. Porter's lodge and gate.

HOLY LIFE.—We cannot begin to lead a holy life, till we first look to Christ for the pardon of sin. Luke i. 74, 75.—*Cole.*

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THE

# WEEKLY VISITOR.

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TRAINING THE HAWK.

## FALCONRY.

FALCONRY and hawking are terms which in common usage are of nearly synonymous import, though some make a difference, in as much as the former consists in a knowledge of the proper methods to be employed in reclaiming or training the hawk, with rules for its general treatment, while the latter applies to the peculiar business of the chase. Though the amusement of falconry is nearly out of use, yet it has left us remembrances in certain legacies of phraseology, which often puzzle common readers at the present day. A few of these terms will suffice.

*Beams.*—The long feathers of the wings. This term is as appropriate for the feathers in question, as that of primaries and secondaries, and has the advantage of being native.

*Bate.*—To strive to get away.

*Mantle.*—To stretch out one wing, by way of easement or relief.

*Warble.*—To cross the wings upon the back.

*Rouge.*—To shake the feathers of the head and body.

*Feak.*—To wipe her bill.

The reader may gather from the three or four last terms, that every act, however unimportant, was carefully marked and recorded. Nay, a little acquaintance with the history of the art shows us that a physician never watched the fluctuations of some terrible disorder, with a minuter and more anxious attention, than these besotted falconers did the hourly health and behaviour of a bird. We add a few more words.

*Truss.*—To raise a fowl aloft, and then descend to the ground to feed on it.

*Stooping.*—Descending to strike.

*Check.* — To forsake its proper object

or quarry, and turn aside to follow crows, &c.

*Cancelicring.*—Turning twice or thrice round to recover herself, after stooping and missing her aim.

*Ruff.*—To hit without trussing.

In the language of falconry, the word "mews" was used to denote the place where hawks were kept at the moulting season. In the reign of Henry VIII., the royal hawks, which had been kept many years at the "mews," at Charing Cross, were removed from thence, and the place was turned into stables. Hence, when ranges of stables were subsequently built at the backs of houses, they were called "mews."

It is common in some parts of the country for the people to say of a dull, unobservant man, "He can't tell a hawk from a hand-saw." This proverb ought to be thus read: "He can't tell a hawk from a *hernshaw*, or *hensaw*;" this word having been in former years the popular name for "heron."

An amusing blunder, arising from the use of one of these technical terms, is recorded by a writer of the seventeenth century:—"Thomas Jermin, going out with his servants and brood-hawks one evening at Bury, they were no sooner abroad, but fowl were found, and he called out to one of his falconers, 'Off with your jerkin.' Jerkin was the term for the sort of hawk the man carried. The fellow being to the wind, did not hear him, at which he stormed and called out, 'Off with your jerkin, you knave, off with your jerkin.' Now, it fell out that there was at that instant a plain townsman of Bury, in a freeze jerkin or close jacket, stood between him and his falconer, who seeing Sir Thomas in such a rage, and thinking he had spoken to him, unbuttoned himself immediately, threw off his jerkin, and besought his worship not to be offended, for he would off with his doublet too, to give him content." May not this little anecdote convey a hint to many among us at the present day, who "off with the jerkin," turn plain words into slang language, and puzzle many of their simple hearers, and perhaps make themselves liable to misrepresentation?

## HISTORY OF FALCONRY.

There are only two countries as to which we have any evidence that the exercise of hawking was very anciently in vogue. These are Thrace and Britain. In the former, it is pursued merely as the diversion of a particular district, according to Pliny, whose account is rendered obscure by the darkness of his own ideas of the matter. The primeval Britains, with a fondness for the exercise of hunting, had also a taste for that of hawking; and every chief among them maintained a considerable number of birds for that sport. It appears, also, that the same diversion was fashionable at a very early period in Scotland. To the Romans, this cruel diversion was scarcely known in the days of Vespasian; yet it was introduced immediately afterwards. Most probably they borrowed it from our ancestors.

In after times, hawking was the principal amusement of the Saxons and English: a person of rank scarce went abroad without a hawk in his hand, which in old paintings is made a criterion of nobility. Harold, afterwards king of England, when he went on a most important embassy into Normandy, is painted as embarking with a bird on his fist, and a dog under his arm; and in an ancient picture of the nuptials of Henry VI., a nobleman is represented in much the same manner; for, in those days, it was thought sufficient for noblemen to wind their horn and to carry their hawk fair, and leave study and learning to the children of mean people! In the reign of James I., Sir Thomas Morison is said to have given £1000 for a cast of hawks: we are not therefore to wonder that many evils attended a pleasure that was carried to such a pitch of extravagance.

In the reign of Edward III., it was made felony to steal a hawk; to take its eggs, even on a person's own ground, was punishable with imprisonment for two years and a day, besides a fine at the king's pleasure! In Elizabeth's reign, the imprisonment was reduced to three months; but the offender was to find security for his good behaviour for seven years, or be in prison till he did! It was then customary for the gentry to dedicate the day to the fowls of the air and the beasts of the field, and to spend the evening in carousing and celebrating their exploits, with the most abandoned sottishness.

This pursuit, however, became neglected from the use of fire-arms, and the disgrace which attached to it, as, like modern horse-racing and cock-fighting, it was cruel in itself, and united with much that was vicious and evil. We would express an earnest hope, that these barbarities may also in their turn become extinct, and be almost wholly forgotten.

Every age is accompanied with its peculiar vices, and each change in outward circumstances, owing to the perverse tendency of the human mind, leads directly to some developement of evil practices. When the wicked habits which prevail in our own times, by appealing at once to our judgments and to our feelings, through their nearness to us, make a deeper impression upon our minds, than those things of which we read or hear, we are apt to speak in accents of regret about the good old times of other years. But when we see more pains bestowed upon the feeding and taming a single hawk than would be required to teach ten poor children to read their Bible, we shall not only see the folly of such pursuits, but be thankful that we live in better days. A well-regulated mind, to whatever subject it be directed, though it will not dwell on such as are useless and hurtful, will not fail to pick up a few hints, which, amid the various exigencies of life, may some time or other be turned to useful account.

We may, in a future number, give some of the remarks relative to falconry, made by those who lived when it was eagerly pursued.

◆

## DANGER OF READING IN THE SIXTEENTH CENTURY.

In the year 1532, Thomas Harding, about easter holidaies when the other people went to the church, tooke his way into the woodes, there solitarily to worship the true living God in spirit and truth. It chanced that one came in great hast to the officer of the towne declaring hee had seen Harding in the woodes looking on a Book, wereupon immediatelie ran desperately to his house to search for Bookes, and in searching went so nigh that under the bords of his floor they found certain English Bookes of holy Scripture, whereupon this godly man with his Bookes was burnt as a relapsed heretic. Such as died in prison, we are told, were thrown out to dogs and birds as unworthy of a christian burial, and yet all this mercilesse commandement notwithstanding, som good men there were which buried those who were thrown out, in take sort whom they were wont privily by night to cover, and many times the archers in the fields standing by and singing together psalmes at their buriall.—*Fox Actes and Monuments.*

## THE ROYAL OBSERVATORY, GREENWICH.

No. IV.

(Continued from page 64.)

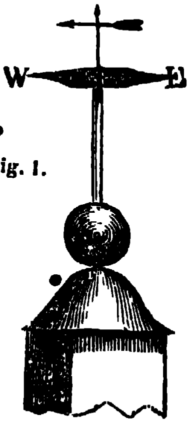


Fig. 1.

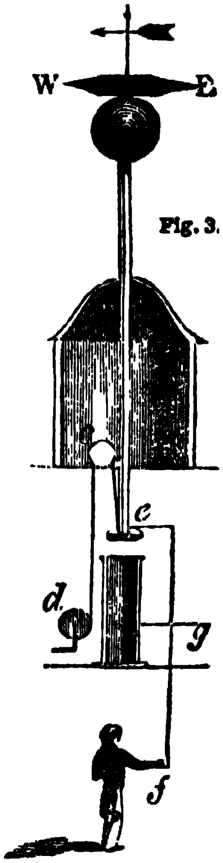


Fig. 3.

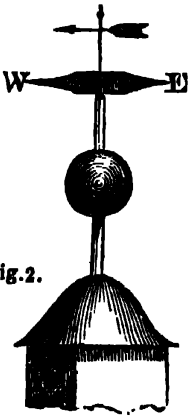


Fig. 2.

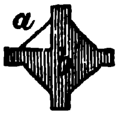


Fig. 4.

The above engraving represents the ball apparatus, erected in the autumn of 1833, on the eastern turret of the principal building.

Figure 1, represents the ball, resting at the bottom of the mast, which is its usual position.

Fig. 2, shows the ball raised half-mast high; this is done at five minutes before one, as a preparatory signal for the public to watch the succeeding operation; it is then raised to the top of the mast, as shown at fig. 3; and at the precise moment of one o'clock, it is dropped suddenly, and resumes its former position at the bottom of the mast till the following day.

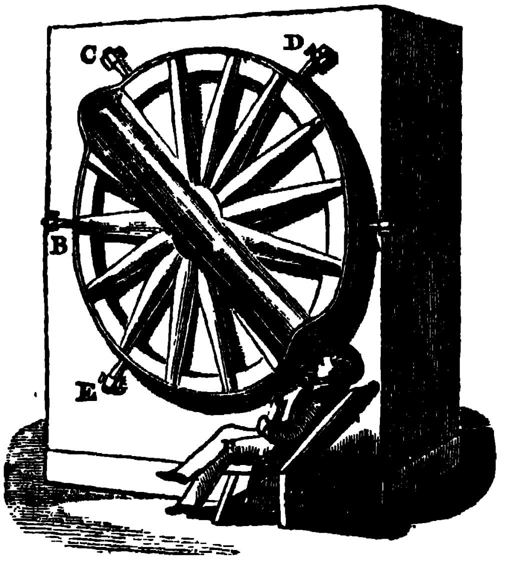
The ball, which is five feet in diameter, is a frame of wood, covered with leather and painted: it is perforated for the mast to pass through as it slides up and down. The shape of the mast is shown at fig. 4, supposing it to be sawn quite across, the triangular piece *a* is moveable in an angle formed in that which is actually the mast, namely, the part *b*. This moveable or sliding rod, is fixed at one end to the ball; and is the means employed to push the ball to the top of the mast, which is accomplished by a chain passing from the bottom of the sliding rod, over a pulley, *c*, (fig. 3,) to a cylinder at *d*, where it is wound round by a person turning a winch. The moment the ball reaches the top of the mast, the lower end of the sliding rod, to which is attached a piston, (something like the plunger of a common squirt,) is caught and held up by two clips *e*; thus the ball is supported till the moment of one o'clock; a person then pressing on a spring at *f* releases the clips at *e*, and down comes the ball.

In order to prevent the ball dropping on the roof of the turret with violence, a cylinder *g* is placed under the piston, to receive it in descending; the air in the cylinder being thus compressed, and gradually forced by the descending weight out at an aperture near the bottom, allows the ball to come to rest very gently.

So satisfactory is the performance of the machinery, that the error of letting off the ball seldom amounts to three tenths of a second.

The mast is surmounted by a wind vane, and a cross denoting the cardinal points of the compass.

We shall next endeavour to explain the nature of a mural circle, and the following engraving represents one of those magnificent instruments, with the position of the observer.



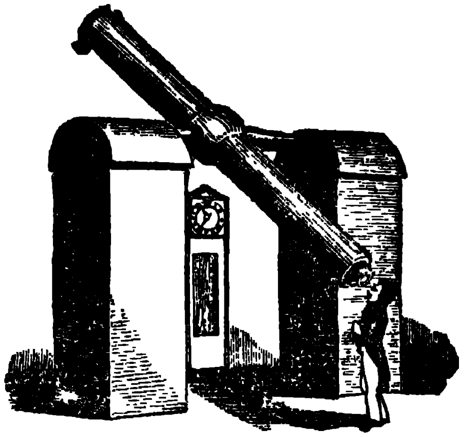
The circles at Greenwich are each of them six feet in diameter, and are connected with their centres by sixteen conical radii, in the same manner as the spokes of a wheel connect the rim with the nave; indeed, the whole instrument very much remembles, both in shape and motion, a coach wheel. The telescope is attached to the face of the circle, and in its inside near the end to which the observer places his eye, are fixed two spiders' threads, drawn very tight across the diameter, and at right angles to each other; their intersection takes place in (and denotes) the centre of the telescope; these spiders' lines are so magnified by the eye-piece of the instrument, that fine as they are, they appear like stout black threads; any thing really stouter would be much too thick when viewed in the telescope.

The axis on which the circle turns passes through a hole in the massive stone pier which supports the instrument, and is fastened on the other side.

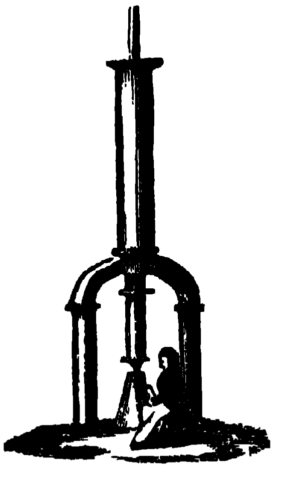
The divisions of the circle into degrees, minutes, &c., are placed round the edge of the rim, and are so exquisitely fine, that they require a microscope of a peculiar construction to read them off; there are six of these microscopes, placed at equal distances round the circle, and are lettered A, B, C, &c., to distinguish them.

The instrument is so fixed as to turn round in one position only, namely, in the plane of the meridian; that is to say, the face of the circle always stands north and south, and the observer waits for the heavenly bodies coming to the meridian (or what is commonly known as their southing) before he makes his observation; he can then measure both their meridional distance from each other, and their distance from the celestial pole, and hence he deduces their declination. Such is the use of the mural circle.

Our next engraving represents the transit instrument, which is ten feet long, and is also fixed so as to move only in the plane of the meridian; a clock of a superior construction is placed in view of the observer, to note the instant a celestial object passes the centre of the telescope, (which centre is denoted by spiders' threads, as before explained,) and if the object is a star whose right ascension is known, the error of the clock is at once found; for if the clock was quite right, it would indicate at that instant the right ascension of the star; therefore, what it differs from it will be the error of the clock. It will now be understood, that one capital use of this instrument is, to determine exact time; another is, to determine the right ascension of all the heavenly bodies, which, together with their declinations found by the mural circles, fixes their relative situations, (a corresponding problem to that in geography, the determination of the latitude and longitude of places,) and celestial maps can be constructed from the results.



The last instrument of great importance we shall notice, is the zenith micrometer represented below. It was erected in July, 1833; it is twenty-five feet long, and was designed to measure with extreme accuracy the zenith distance of the star γ Draconis, with a view to determine the amount (if any) of its annual parallax, and hence its distance from the earth; this, however, appears to be altogether inappreciable; consequently, any thing like the correct distance of the fixed star is likely still to remain unknown.



The question of parallax has long been a subject of great interest amongst astronomers; Dr. Bradley devoted much time to it, and was rewarded for his labours by discovering, in his researches, the aberration of the fixed stars, and the nutation of the earth's axis; two of the most splendid scientific discoveries of the last century.

We have now brought the account of our great national Observatory to a close; hoping that our humble efforts may have done something more than merely beguile the time of our readers. Ours is, as far as we are aware, the first attempt at making public any thing like a connected account of this establishment, and much of the information we have been able to communicate has never before met the public eye. In a country like ours, the commercial relations of which are so extensive, and whose ships, conveying the lives and property of our countrymen to distant climes, are daily trusting for safety and guidance across the pathless waters, to the researches of the astronomer, the maintenance of such an establishment is of the highest importance. Also, by the same researches new light and information continually break upon us, bringing us to a nearer acquaintance with the vastness of the power and wisdom displayed in the creation and government of the mighty universe; leading us in humility to adore and praise that Almighty Being, who upholdeth all things by the word of his power.

"Here truth sublime, and sacred science charm,
  Creative arts new faculties supply,
Mechanic powers give more than giant's arm,
  And piercing optics more than eagle's eye,
Eyes that explore creation's wondrous laws,
And teach us to adore the great designing cause!"

S—s.

## SCRIPTURE EXPLANATIONS.—No XXII.

"But Jonathan heard not when his father charged the people with the oath: wherefore he put forth the end of the rod that was in his hand, and dipped it in a honey-comb, and put his hand to his mouth; and his eyes were enlightened."—1 Sam xiv. 27.

This is a simple account of the efficacy of honey, when the stomach is worn out by fasting and toil: it is incidentally introduced without any attempt to surprise us, in showing by what slight causes great results are sometimes produced. We have often reflected upon the fact mentioned in the text, and were not a little delighted, while looking over the recipes for various culinary preparations in a Latin work, De Re Culinaria, which some ascribe to Apicius Cœlius, who lived in the reign of Augustus and Tiberius, to find that honey was the chief ingredient in a confection to stay the stomach, and prolong the bodily strength during periods of necessary abstinence. It is recommended in that recipe, that pepper be pounded in a mortar with honey, and the foam be removed, from time to time, during that process. The addition of a little wine is also suggested, to correct the alterative effects it may have upon the system. This preparation is entitled Conditum Melizomum, and by the latter term, simply intimates, that it is a seasoning made with honey. A story is told of Democritus, says Athenæus, that, growing weary of old age, he determined to withdraw himself from this life, by abstaining from his daily food. It happened, however, that the Thesmophoria, a public festival, was about to be celebrated : the females of his household, therefore, besought him to drop the intention of dying till after the anniversary, that they might not be prevented from keeping the feast. The philosopher yielded to their entreaties, and ordered a pot of honey to be set near him, by the simple use of which, he is said to have prolonged his existence a sufficient number of days to let his domestics enjoy the customary solemnities of the festival, without any interference from the required rites of mourning for the dead. Democritus, it is said, was always fond of honey, and when asked how a man might enjoy good health, he replied, If he moistens the inside with honey, and the outside with olive oil. The diet of the Pythagoreans was bread with honey, as Aristoxenus tells us, who adds, that those who use them, surpass others in living exempt from disease. And Lycus says, that the inhabitants of Corsica formerly attained to a great age, through the constant employment of honey. All substances containing saccharine matter, or sugar, are highly nutritious and of easy assimilation. When the writer was staying at Oahu, one of the Sandwich Islands, the fresh juice of the sugar-cane was recommended as an excellent resort to stay and soothe the stomach, when the tone was reduced by long fasting; and its good effects were more than once experienced.

## No. XXXIII.

*(Their Expansion, continued.)*

It seems from Reaumur's description, that the wings of some flies, instead of the straight, transverse folds of others, have angular, or zigzag folds, which equally shorten the wing. Others have wings without any nervures, except the marginal. It is, probably, that these are more simply folded, so as to render their expansion more easy; but, even in these wings, there are often tracheæ, which appear as spurious nervures, and help to effect the purpose we are considering.

Of the expansion of the silk-worm, an interesting account is given by Malpighi. "At length," he says, "within four days, the heart of the silk-worm continues moving slowly, and the body growing bigger, having thrown off the outward skin like a slough, the pupa appears a new creature. The throwing off the old, and assuming the new form, is completed in the space of one minute and ten seconds; and it is thus done, as I chanced to see it. The motion of the heart is very quick at first, and the whole frame of the body appears convulsed; so that the several circular folds of the segments emerge, and by the transverse contraction of the sides, the external skin is separated from the inner; hence, upon making an effort, and thrusting the body, which now appears particularly thick towards the head, the skin is driven backward and downward, and the portions of the windpipe being separated from their external proper orifices, are thrown away with the skin, which is then cast off. By this motion, a cleft or opening is made in the back near the head, and through the aperture the body makes its way, the skin being by degrees drawn back towards the tail. This process is greatly assisted by a yellow kind of ichor, which exudes from the cavities of the skull, and the pupa appears then free and disengaged.

"While the insect is making its passage out, the antennæ are separated from the body of the pupa, and are torn, as it were, out of two cavities of the skull; and their length, as they become unfolded, occupies the same place which the two muscles of the mandibles formerly occupied. The wings, also, and the legs, appear to be circumscribed in their limits; the wings being drawn from their situation near the fore-legs, and the legs from the lateral parts of the back. But as these unfolded parts are yet mucous, they easily stick to each other, and, insensibly growing dry, they become so closely united, that the pupa appears like one entire garment. Now, as these parts are peculiar to the moths, and are destined for their use, the nature of the moths seems to be, to emerge sooner from the state of the caterpillar than is commonly believed, and also to be earlier implanted in it; for, evidently, in the silk-worm, the beginnings of the wings may be seen under the second and third rings of the body, before the texture of the web. The antennæ are likewise delineated on the skull; and the web being finished, they have their own termination; nor will it be improper to suppose, that the new kind of life in the pupa, is only a mask or veil of the moth, which is already perfect within, the intent of which is, that it should not be struck or destroyed by external injuries, but might grow strong and ripen."

There is now produced a violent agitation in the fluids of the little creature, so that they are driven from the internal vessels through the tubes in the wings, which are likewise supplied with air from the windpipe. The insect, besides, labours violently with its legs; and, all these motions concurring with the growth of the wings, the tender skin which covers it gives way, by bursting in four distinct and regular pieces. As the legs become disengaged, they greatly assist in freeing the body and other parts that are yet bound up; at the same time, the skin on the back flies open, and uncovers the wings and shoulders. After this, the insect remains for some time in a state of rest, with its wings drooping down like wet paper, and its legs fixed in the skin which it has just cast off, together with the lining of the windpipe and breathing spiracles. This enables the insect to take more air into its body, and thereby renders it the better able to fly, and perform the other functions dependent on a good supply of air. In consequence of this, the wings expand so rapidly, that it is by no means easy to trace their unfolding; for, in the space of a few minutes, they increase in dimensions about four-fold. Their spots and colours at the same time, previously so small as to be scarcely discernible, become proportionately extended; so that, what appeared but a few minutes before as a number of confused and indistinct points, acquires many varied beauties of colour and form. From the sudden extension of the wings, their soft, wrinkled appearance is, in less than half an hour, no longer visible, and the insect becomes fitted for flight.

The operation of expanding their wings, in by far the greater number of instances, takes place gradually; and according to their size, is ended in five, ten, or fifteen minutes; in some butterflies, it occupies half an hour, in some even an hour. A few species require several hours, or even a day, for this operation; and, from the distance to which they creep before it has taken place, a considerable degree of motion seems requisite for causing the necessary impulse of the expanding fluids. In a few genera, this process is so rapid and instantaneous, that the wings are scarcely disengaged from the wing-cases, before they are fully expanded and fit for flying. These genera quit the pupa at the surface of the water, from which, after resting upon it for a few moments, they take flight; but this would evidently be impracticable, and death would result, were not the general rule in their case departed from.

Some species of the ephemera are distinguished by another peculiarity, unparalleled, as far as is known, in the rest of the insect world. After being released from the puparium, and making use of their expanded wings for flight, often to a considerable distance, they have yet to undergo another change. They fix themselves by their claws, in a vertical position, on some object, and withdraw every part of the body, even the legs and wings, from a thin pellicle, which has inclosed them, as a glove does the fingers. It is easy to conceive how the body, and even legs, can be withdrawn from their cases; but it is not so easy to imagine how the wings, which seem as thin, as much expanded, and as rigid as those of a fly, can admit of having any sheath stripped from them; much less how they can be withdrawn, as they are, through a small opening at the base of the sheath. The fact seems to be, that though the outer covering is rigid, the wing inclosed in it, notwithstanding it is sometimes more than twenty-four hours before the change ensues, is kept moist and pliable. In proportion, therefore, as the insect disengages itself from the anterior part of the skin, the interior or real wings become contracted, by a number of plaits, into a form nearly cylindrical, which readily admits of their being pulled through the opening lately mentioned; and as soon as the insect is released from its envelope, the plaits unfold, and the wing returns to its former shape and dimensions.

The body of newly-disclosed insects commonly appears, at first, of its full size; but the aphis-eating flies, and some others, in about a quarter of an hour after leaving the pupa, become at least twice as large as they were at their first appearance. This apparent sudden growth, Reaumur found to depend on the expansion of the previously compressed segments of the animal, by means of the included air.

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## THE TESTIMONY OF A PAGAN MAGISTRATE TO THE EXCELLENCY OF CHRISTIANITY.

A Chinese mandarin, who had the chief command of the royal troops in Cochin-China, perceiving one day, near the court, a number of men beneath the canga, (an instrument of torture,) said, "Where have they seized on so many thieves at a time?" It was answered, that they were not thieves, but christians, whose religion the king had forbidden under pain of death. "How," replied he, "condemned for being christians! Can their religion be any crime against the government? Do they not pay taxes as well as others? Do they not assist at the public works? Do they not bear arms? Do they not go to battle? Do they not follow our standard from north to south? What more can be required of them? Why should we concern ourselves about their religion, provided they prove good and faithful subjects? It is we, the disciples of Phat and Confucius, and especially we mandarins, who know no other law than our own wills, nor rule of life but our own concupiscence, that seize, without scruple, the gardens and fields of the poor; that violate, without shame, the wives of others, and carry off their daughters by force; whereas the christians confine themselves to one wife, without daring to approach the wives or daughters of others. In a word, they are an upright and simple people, who do no injury to any one.

"When I was very young," continued he, "there was a libertine with whom I was acquainted, who became a notorious thief. His family left no means untried to reclaim him from his wicked course of life. He had often been severely whipped, imprisoned, and even threatened with death by the heads of the village, but to no purpose, for nothing could intimidate him. At length, after an absence of many years, I met him by accident, and was astonished beyond measure at the alteration I perceived in him, being now neither a libertine, a gambler, nor a thief. I asked him the reason of so surprising a change. To which he replied, that he had married a christian woman, who by her exhortations and example, had converted him to her religion; he no longer dared to persevere in his wicked course of life, because it was forbidden by that religion. Behold," added the mandarin, "what the magistrates could not effect by the force of their authority, a wife has accomplished by the influence of her religion! Ought a religion, therefore, which has the power of putting a stop to such disorders; ought a religion, which can convert a thief into an honest man; ought such a religion to be proscribed or condemned? I defy," continued he, "yours or mine to do as much."—*American Baptist Journal.*

## THE KINGDOM OF CHRIST.

The hand of Providence has been visible in many important events, which have distinguished these latter ages; all concurring mutually to promote each other, and all seeming uniformly to tend to the same point. The revival of learning, arts, and sciences; their progress westward; their great increase among those who were able to diffuse them most widely, and to carry their influence to the most distant parts; the invention of printing; the reformation of religion in Europe; the discovery of the long-hidden continent of America; the opening of a new passage to the east; the improvement of navigation; the extension of commerce; the continual addition of new regions to the known parts of the world, and the communication rendered more safe and easy between the most remote: all these bearings and tendencies indicate a general effort, under a superior direction, towards a union and comprehension of the affairs of mankind in one great system; not a system of civil policy, not of universal temporal dominion; for no such shall ever arise: the only universal kingdom, which shall henceforth be established upon earth, is the spiritual kingdom of Christ. "To him shall be given dominion, and glory, and a kingdom, that all people, nations, and languages, should serve him: his dominion is an everlasting dominion, which shall not pass away; and his kingdom that which shall not be destroyed." Dan. vii. 14.—*Bishop Lowth.*

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## THE WILL OF GOD.

This is the strongest and most binding reason that can be used to a christian mind, which hath resigned itself to be governed by that rule, to have "the will of God" for its law. Whatsoever is required of it upon that warrant, it cannot refuse. Although it cross a man's own humour, or his private interest, yet if his heart be subjected to the will of God, he will not stand with him in any thing. One word from God, "I will have it so," silences all, and carries it against all opposition.—*Leighton.*

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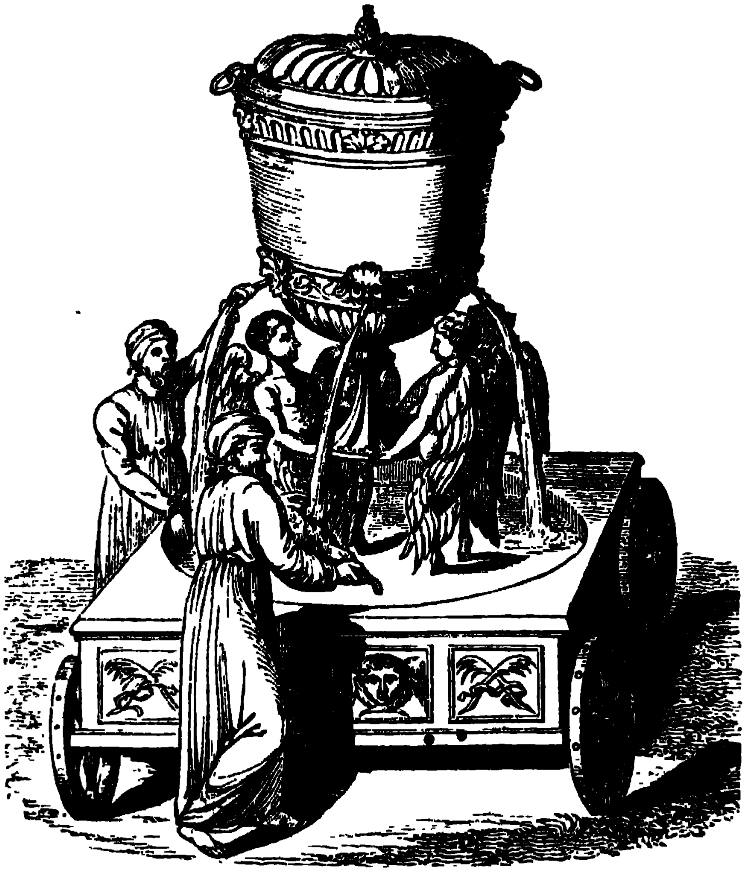

THE BRAZEN LAVER.

THE above sketch will afford some idea of the form and nature of the brazen lavers made by Solomon for the gorgeous temple which he built, (see 1 Kings vii. 27—39.) They were vessels borne by four cherubim standing upon bases or pedestals, mounted on brazen wheels, and furnished with handles, by which they were drawn about the temple wherever they might be wanted. These lavers were double, that is to say, composed of a basin that received the water which fell from another square vessel above it, from which they drew water with cocks. The whole of the work was of brass; the square vessels were adorned with the heads of a lion, an ox, and a cherub. Each of these lavers contained forty baths, or nearly thirty-three gallons. Ten of these lavers were made by Hiram, king of Tyre, 1 Kings vii. 40. They were all alike in size and workmanship; and five were placed on the right hand, and five on the left, of the first temple, between the altar of burnt-offerings and the steps which led to the porch of the temple.

The use of these lavers was to accommodate the officiating priest with a supply of water for those frequent washings and purifications enjoined upon the Jews in their typical worship; which washings were strong similitudes of that spiritual washing and purification of the heart of man, by the grace of God, through which alone he can be restored to the favour of his offended Creator, and be enabled to live soberly, righteously, and godly in the present world.

We are thus taught, that they must be very clean that bear the vessels of the Lord. Spiritual priests, and spiritual sacrifices, must be washed in the laver of Christ's blood, and of regeneration. We must wash often, for we daily contract pollution; we must cleanse our hands, and purify our hearts. Plentiful provision is made for our cleansing; so that if we have our lot for ever among the unclean, it will be our own fault. Let us, therefore, bless God for the fountain which he hath opened by the sacrifice of Christ for sin and for uncleanness.

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## ASTRONOMY.

### THE IMPORTANCE OF ASTRONOMY AS ILLUSTRATING THE WISDOM AND POWER OF GOD.

The discoveries of astronomers offer some most interesting and astonishing illustrations of the wisdom and power of God, as exhibited in material creation. This statement will be best proved by a few examples.

The solar system consists of eleven planets, all of which revolve round the sun in orbits nearly circular, some of them being attended by satellites that move in orbits of the same form. These motions are produced and preserved by the constant exertion of two opposite but equally balanced forces, (see *Weekly Visitor*, for 1834, page 426.) The attraction of the sun prevents the planets from flying off into space, and that of the planets supports the satellites. All these bodies have an influence on one another at a distance, connecting themselves together as certainly as though they were absolutely united, and that influence is the attraction of gravitation.

Now, supposing that the opinions of the fatalist could be true, and that the particles of which the planetary bodies are composed had once wandered about in space without control, but casually meeting together had united, and formed bodies, what is there to support his opinions when his data are admitted? The word of God informs us, that it is the fool who has said in his heart, "There is no God," and yet there have been such among philosophers; men whose intellects have been strengthened by the study of the visible works of the Creator; and these have contemned his authority, or rather have denied his existence, and attributed all things to that vague and indefinable thing they call chance. But supposing that we could admit their data, and concede to them that the worlds were formed by the fortuitous combination of atoms, they would find it difficult to prove that they ought necessarily to revolve in their present orbits. The orbits in which the planets revolve are nearly circular, each differing from the others in a small degree, and yet all bearing a considerable resemblance. They might have moved in other than their present oval orbits, and there would be nothing very remarkable in that, for a different impulse would give a different curve; but they all revolve in paths that are nearly circular, and we may be permitted to ask the atheistical astronomer, How it has happened that the planets revolve in their present concentric orbits?

It cannot be denied that this is a most singular circumstance, and could not arise from chance, for if chance regulated the the paths of the planets, why do not some of them move in circles, and others in ovals? or, in other words, how has it happened that the orbits of the planets are nearly concentric circles? The idea of chance having directed the paths of the wandering stars is worse than absurd. They have evidently been placed in such positions, and compelled to take such paths, as must prevent them from interfering with each other's motions, either by positive contact, or by the powerful disturbing force they might have exerted upon each other. There are proofs, therefore, in the very arrangements of the solar system, of the agency of a wise, as well as of a powerful mind, of that God who is "excellent in power, and in judgment."

But the existence and wisdom of a superintending Being may be deduced, not only from the choice of particular orbits, a contact or disarrangement of the bodies being thus prevented, but also from their eccentricities. In the instance of our earth, whose greatest and least distances from the sun are as 12 to 13, we see an adaptation of planetary motion to the existence of animal and vegetable life. If the eccentricity were as 1 to 2, or as 1 to 3, the present course of the seasons would be disturbed, and so great would be the differences of temperature upon the surface of the earth, that the changes could scarcely fail to be destructive of life.

There is another view of the solar system, that impresses us with a sublime conception of the Divine Being, and that is, its stability. The present arrangement of the members of the solar system, as far as investigation has carried us, is the only one by which the stability of the whole could be secured. In contemplating the stability of the system, it must be borne in mind, that the planets are not only attracted by the sun, but that they attract each other. The earth, for instance, is attracted by the central body, but it is proportionally affected, that is, according to their masses and distance, by Mercury, Venus, Jupiter, and the other planets, even by the remote Herschel. All these planetary bodies are constantly changing their positions in relation to the earth, and to each other; and upon the discovery of this fact, we are naturally led to inquire, what will be the ultimate result of these combined attractions. The question is not whether they will produce an immediate effect injurious to the general stability of the system, but whether they will not do so in ages to come. In a single revolution their influence must be small, for the attractions of all the planetary bodies, by which the disturbances are produced, are insignificant when compared with that of the sun. But if these slight influences continue to act upon the body, revolution after revolution, they must in process of time, remove it from its present orbit.

To bring our inquiry to a particular point, let us ask whether it be not possible that the attractions of the planets may, in process of time, draw the earth from its orbit, and thus produce all the evils that would result from a change of seasons. Or, is it not possible, that it may thus be drawn so near to another body, as to cause a universal deluge? There are perturbations; and, if they can be carried on without limit, there is no possibility of calculating, or even of imagining, the wretched condition to which the earth and all its sister planets may be reduced, by their long-continued and progressive action on each other.

The eccentricity of the earth's orbit has been decreasing from the period when astronomical observations were first made, and its satellite the moon has been moving more and more rapidly, from the time of the first recorded eclipse. It may be an object of rational inquiry, When will these changes end? What, but destruction, can result from these innovations on the beauty, harmony, and stability of the system? But the Author of this incomparable mechanism has not left his work to disarrange and destroy itself: there is a limit to these changes in the very constitution of the system. They may go on progressing for a time, but they must end; and the bodies that are for a while disarranged, be brought again to their first condition. It may be readily imagined, that it is not an easy problem to determine the amount of these perturbations, and the time when they will be corrected; for, it must be remembered that, every fresh position of the disturbing bodies, will cause an alteration in the motion of the body acted on. But, Lagrange and Laplace have proved, that these perturbations cannot exceed a certain uninjurious limit. The effect produced upon a planet, by the attractions of minor bodies, are only periodical; they reach a maximum, and then gradually cease to operate; so that, the disturbed body is brought again into the orbit from which it had departed, without any derangement of the order of the system.

Can any thing give us a more elevated notion of the wise arrangements of the Supreme God, than these considerations? If these bodies had been projected with either greater or less velocity than they were, the planets would have moved in orbits of greater or less eccentricities; and then the stability of the entire system would have been destroyed, and an element of destruction have been introduced. It will therefore appear, that no other arrangement, as far as we can judge, from the calculations that have been made, would have produced the desired effect, or ensured the combination from destruction.

The immensity of the universe, and the number and vastness of the bodies composing it, are also calculated to give us a sublime conception of the Creator. If, on some unclouded night, we take a survey of the bright hemisphere above us, what a sublime sight is presented to our view! Thousands of worlds surround us: worlds that, for aught we know, may be as thickly inhabited as our own; and all these are at a distance too great to be measured, and yet possessing in themselves a light, sufficiently intense, to cast a glimmering ray upon the earth. Ask the astronomer what they are, and he will tell you they are suns, which, in all probability, are the centres of systems, as large and as important as that of which the earth is an individual, and, comparatively, an insignificant member. But, when the observer avails himself of the aid which is offered by art, he is lost in the contemplation of the immense number of worlds presented to his view. The entire hemisphere now seems to be studded with stars: millions of bodies are before him, and all are regulated by the same laws, and governed by the same almighty power. Can any appearance in material existence raise our conceptions of the wisdom and power of the Supreme higher than such a view as this; unless it be the combined evidences of the mighty energy which supports these systems, and the solicitude evinced in his provisions for man and inferior creatures?

Thus far our contracted powers carry us; but the universe exceeds our most exalted conceptions. The imagination may take its highest flight, and reason may pursue its boldest inquiries, and their united efforts can only impress us with the shadow of the sublime attributes of God. But, at the same time, we cannot but remember, that we can only think as creatures, who, though in possession of noble powers, judge with depraved minds, of the works of a Being, whose spirituality is unencumbered with any corporeal weakness, with error, or ignorance.

This estimate of astronomical phenomena, as associated with a noble conception of the Creator, is suited to every mind that possesses a power of raising itself in any degree above the sordid influence of animal gratifications; but, how much more to the mind that has acquired its estimate of the Divine character, and man's condition, from revelation! It is true, that the man who is alive to all those impressions of beauty and sublimity, which external circumstances are calculated to excite, may derive no ordinary gratification from the consideration of those adaptations, of which we have spoken. The man of intellect, too often harassed with the feverish excitement of prolonged thought, or raised to a high state of sensibility by the cold indifference or unmerited taunts and neglect of the world and of friends, should dwell on such considerations to subdue his over-wrought and agitated mind. To such a man, these sublime truths must appeal with more than common force. With a consciousness of his intellectual superiority to the crowd who affect to despise his pursuits, and to pity him, he is tempted to persuade himself that, in comparison with them, he is a being of superior order. But, when he suffers from injustice or oppression, or feels in the miseries of want, the result of that peculiar character of mind, which, as he knows, distinguishes him from his fellow-men, he is ready to wish that he had been as insensible as they to the predominant principle, that raises him above them. At such a moment, the proud and discontented thought should be checked by a remembrance of the condition in which the man himself is placed; the relation he bears to the material world; and the display of benevolent wisdom that has so set in order the laws by which all things are governed, as to produce the happiness and security of his immense family.

But, let the same mind be deeply impressed with all the truths of scripture—let it feel its natural condition in relation to God, and have the assurance that it possesses, by an acceptance of his method of mercy, the favour of Him who is the Saviour as well as the Creator of man, and it will then be in a far better condition to trace the impress of the Divine Author in all it perceives. The confidence which is gathered from an estimate of the adaptation of all arrangements to produce happiness, will blend with that which the man draws from the sacred volume; and, with a feeling of security in all the changes of material phenomena, he will combine the still more delightful reflection, that when all those senses which are so open to pleasures from external adaptations shall cease to be affected by them, he will behold their Author, and enjoy his favour for ever.

### THE IMPORTANCE OF ASTRONOMY IN ITS APPLICATION TO NAVIGATION.

As soon as we begin to consider the uses of Astronomy, we call to mind its important application to the science of navigation. There was a time when the ocean was an impassable barrier between one country and another; and, it must still have been so, had not astronomy lent its aid to the art of guiding a vessel over the ocean. Recall to mind the state of society, when the sailor durst not venture his bark on the trackless waters beyond the sight of land; or consider, what would be the condition of England at the present moment, if we were ignorant of the motions of the heavenly bodies, and the art of calculating their positions. Imagine all the knowledge we have of astronomy to be entirely forgotten; our treatises and our tables to be burnt; and those in whom the knowledge is personified, to be destroyed by a second horde of barbarians; or imagine us as a nation to be entirely ignorant of the celestial science, and how different will be the scene then presented to the mind, from that we are accustomed to witness! An attempt to direct a vessel over the billows, under such circumstances, would require an intrepidity and self-sufficiency, nothing inferior in degree to that which dictated the words of Cesar, when he said to the terrified mariner, "What dost *thou* fear? thy vessel carries *Cesar*." That in every age of the world, minds have existed in which an unconquerable obstinacy of purpose, and intrepidity of action, have been the governing principle, is not sufficient to do away with the importance of those guides to navigation which astronomy affords. Had it not been for astronomy, we might still have been deceived by our senses, and have imagined the earth to be an immense plain, encircled by an impassable ocean; and, under this conviction, have experienced no feeling that might rouse the powers of mind necessary for enterprise, and have satisfied ourselves with the conviction, that there was no appropriate or hopeful field of action. Or, had the attempt been made, like Diaz, the unprotected mariner might well have been terrified with the stormy turbulence of the Atlantic and Indian oceans, and still more by their vast extent. It is, indeed, as impossible to imagine what means could have been devised to give security to navigation, with an ignorance of astronomy, as it is to compare the present condition of mankind, with what it would have been under such circumstances. If these principles were forgotten or lost, the communication between nation and nation must be restricted to land carriage and coasting voyages; all the growing improvements in ship-building would be useless; the important and almost universal agency of steam would lose half its value; and, some of the most interesting and important principles in mechanics and hydrostatics might be erased from our works on practical science.

But if it be astronomy that gives security to navigation, we are indebted to it for our commerce. By the power we possess of directing a vessel over the water, from one country to another, we are able to procure the produce of other nations, by bartering the superfluous productions of our own soil and manufactories, for foreign articles. This is the origin of commerce; it is this gives activity to our intelligent population. Without it industry would want an object, and intellect a stimulus; and as indolence increases crime, vice would predominate in society. All this is in part prevented by commerce, which depends on navigation, while navigation depends on astronomy.

After a consideration of the influence of astronomy upon navigation, and the indirect influence it exerts upon the public morals, it is but little to add, that we are indebted to it for many of the comforts and luxuries of life. Not half the articles of consumption in this country are the growth of its own soil, for there are few branches of trade that are not in some measure dependent on the importation of foreign produce. The raw materials used in many of our manufactories, are the growth of distant lands, and not only are we indebted to navigation for the supply of our individual wants, but in many instances commerce and civilization are aided by the conveyance of the same materials in a manufactured state to their original cultivators.

But these are not the only positions under which we may consider the importance of astronomy in its application to the art of guiding a vessel over the ocean. If astronomical phenomena had never been studied, and the laws which govern the motions of the heavenly bodies had not been determined, the human race might at this moment have been confined to a small extent of country, and have been little more civilized than many of the barbarians who, in the present day, have no resource beyond their personal exertions. We can scarcely have a stronger idea of what human nature would have been, than by a consideration of what the inhabitants of a large portion of central Africa are. Lander has mentioned, with surprise, the ignorance of those who live on the banks of the Niger, of its rise, course, and termination; and many other nations are ignorant of navigation, but this is a necessary result of a want of astronomical knowledge. Had they possessed a knowledge of astronomy, they would have acquired the power of guiding a vessel over the sea; a spirit of enterprise would have been induced or encouraged, and they might have become a commercial people. But being ignorant, they have no curiosity; their intercourse with men is confined to the inhabitants of a few of the neighbouring states, and upon themselves alone they depend for the production of the articles required for the support of life. With this confined view of society, and possessing the indolence and love of authority common to man, oppression and robbery are every where practised, and vicious and degrading habits are the characteristics by which they are known.

A picture not much unlike that which is now presented in Central Africa, would have represented human nature in general, had not the mind been enlarged, and industry been excited by the commerce which has resulted from an application of astronomical knowledge to the art of navigation. This happy discovery has distributed men over the whole earth; different climes have enabled them to raise different productions, and the intercourse that is maintained, has given them an opportunity of exchanging their surplus produce: in this way the comforts of man have been increased, and civilization and social welfare secured.

In estimating the condition of man without astronomical knowledge, we have not attempted to determine how much these results would have been modified by the chastening influence of religion. But as God has been pleased to employ human means, in some measure, for the circulation of his Divine truth, we may consider it probable, that the improvement of the mind, and a civilized state of society, has been made greatly subservient to its progress among the European nations. In many of the events that happened in the history of nations, God has evidently directed the hearts of men for the accomplishment of his own purposes, and having in his providence brought about a particular state of affairs, he has prepared agents for the introduction and circulation of his message of mercy. It is therefore pleasing to the truly devout mind, to contemplate all the changes that have resulted from the study of astronomy, as instruments in his hand, for the improvement of the intellectual powers and religious condition of mankind. From the earliest ages in the history of the world, the eye of the inquiring man has been directed to the mysterious movements of the heavenly bodies, as worthy his most careful thought. This early devotion of the mind, to a particular investigation, was the cause of the advance of astronomy before all other sciences. As soon as a tolerably accurate knowledge of the motions and appearances of the stars had been attained, the importance of the application of this information to navigation was appreciated and in after ages became themeans of distributing the human race over the inhabitable portions of the earth, and of improving their intellectual and social condition. All this was but the prelude to the accomplishment of God's intentions of mercy; for the means that are employed for conveying the natural product of the soil from one country to another, are now used for the circulation of the bible and tracts, the sending forth of missionaries, and the diffusion of that knowledge which is necessary for the restoration of man to the favour of his offended Creator.

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### THE IMPORTANCE OF ASTRONOMY AS AFFORDING A STANDARD MEASUREMENT OF TIME.

THE present method of dividing time is a practical advantage provided by astronomy. The idea of time is entirely dependent on the perception of succession. It exists independently of vision, and is a mental perception of the succession of one idea after another. If we imagine all material objects to be at rest, the idea of succession, and consequently of time, is still present to the mind; for we are conscious, even when shut out from all exterior objects, that one thought arises after another. But if we should be surrounded by moving material objects, such as the flowing sea, the rising and setting sun, and the planetary bodies, we obtain a notion of the division of time. The idea of time, however, is not more distinct in this instance than in the former; in the one we derive the idea from a succession of material objects, in the other from a succession of thoughts.

Strictly speaking, time is indivisible; it is a constant succession; yet by the perceptible intervals between the occurrence of an event it may be measured. For the measurement of time there must be some standard, and that standard must be an appearance recurring at constant and equal intervals. The tides, for instance, would furnish us with a standard, did they rise and fall in equal periods. But this is not the case, and there is no phenomenon on the surface of the earth that is presented with a regularity sufficient to warrant its use as a standard of measurement. All the phenomena resulting from motion on the surface of the earth, are influenced by so many disturbing forces that their velocity is continually changing. If we were compelled to select a standard from terrestrial appearances, we should probably find the best approximation in thevegetable world.

Being thus deprived of the hope of discovering a standard for the measurement of time, in any terrestrial motion, we must seek for it in the motion of the heavenly bodies. It is a singular fact, that in every age of the world men have been apparently aware of the inexpediency of expecting it in any other sphere of material phenomena. But although we find the most correct standard by which to measure the lapse of time in the motions of the heavenly bodies, these do not furnish us with a very obvious method of measurement. The vicissitudes of day and night might give a rude division, and the heliacal* rising or setting of peculiar stars at different periods of the year a more extended measure of duration. But the length of the day perpetually varies, and in the course of years the star that once declared the commencement of a certain period or season ceases to be its messenger. The ancient Egyptians waited the overflow of the Nile when Sirius, the dog-star, rose with the sun; but Sirius has for many ages ceased to precede that event; and Aldebaran once rose heliacally on the first of May, but that star long since failed thus to attend the month of vernal hilarity and of flowers.

The motion of the earth on its axis is, however, an event of sufficient regularity to be employed as a standard measurement of time. If we take any other planetary motion, it is equally certain and uniform, but is rendered by the motion of the earth in its orbit so apparently irregular, that we cannot, without long calculation, determine its precise change of position. But the time occupied by the earth in a revolution on its axis from west to east is so uniform, that the apparent motion of the stars from east to west may be appropriately adopted as a standard by which to compute the lapse of time. The time which intervenes between the period when a star is seen on the meridian, and that in which it returns to the same point, is by the universal consent of astronomers denominated a siderial day, and has been divided into twenty-four equal parts, called siderial hours.

The motion of the earth on its axis also gives to the sun an apparent daily motion from east to west, and there are many practical reasons why the sun should be chosen as our standard of measurement in preference to the stars, although our divisions may not be so accurate. If we observe the sun when on the meridian, that is, at noon, we see it gradually descend and pass through the western horizon to rise in the east, and to return again to the meridian. The period occupied in performing this revolution is called a solar day. But a solar day is of longer duration than a siderial day; for although the sun and the star may be on the meridian at the same time to-day, the star will arrive there to-morrow a few moments before the sun. This is occasioned by the apparent yearly motion of the sun in the ecliptic, produced by the real annual motion of the earth. Now when we measure day after day, the intervals between the successive arrivals of the sun on the meridian, we discover that the period is variable; sometimes it is more than twenty-four siderial hours, and sometimes less. There is therefore not only a difference between the siderial and the solar day, but also a variation in the length of the solar day, from which cause we are compelled to take a mean of the whole, and this is called a mean solar day; one twenty-fourth part of which is a mean solar hour. This division has been adopted as the civil standard of time.

The standard for the larger division of time, a year, has also been selected from the motion of the earth. In consequence of the real revolution of the earth round the sun as the centre of the system, the sun has an apparent annual revolution in the ecliptic. This motion is not so uniform as that by which we regulate our day, and a somewhat artificial arrangement has been adopted to correct the apparent irregularity.

The slightest reflection upon the condition of a man as a social being will show the necessity for a division of time, and the benefit conferred on society by astronomy in providing the means. What would be the state of our large mercantile towns and cities, and how could their business be conducted, if there were no means of dividing time by a common standard? It is absolutely necessary for the well-being of society, and this has been acknowledged in every age, and by men of all ranks in civilized states.

Now, let it be imagined that these standards of measurement were destroyed, by what means could time be divided, and how could engagements be regulated? We might indeed be compelled to determine its lapse by the dripping of water, or by the burning of a candle; or if we imagine watches and other mechanical contrivances to be known, by what are they to be regulated, and how can their rate of motion be determined? A discordance in our measurements must necessarily result from such a condition, which would ultimately destroy all punctuality, and introduce a spirit of carelessness and indifference into all the necessary engagements of life. And not only would it thus act directly upon society, but it would put an end to a large branch of astronomical observations which have an untraced but beneficial influence upon the comforts of man.

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* An epithet for the rising and setting of a star or planet, when it rises and sets with, or at the same time as the sun.

At some distant period in the history of man, the accurate division of time may have appeared as absurd to the uneducated portion of the community as many of the expectations of the learned in the present or in recent times. It is true that there must always have been the rude division of day and night, which may have been sufficient for the purposes of an almost unemployed people. But as soon as men began to congregate together, to build cities, to surround themselves with their own works, and to shut out the very sight of the great ruler of the day, some better division of time was required, and that astronomy, aided by art, has accomplished. H.

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### ON SUFFERING.

Acquaint your thoughts and hearts with sufferings, that when they come, thou and they may agree and comply the better. Do not afflict yourselves with vain fears before-hand of troubles to come, and so make uncertain evils a certain vexation; but thus forethink the hardest trial you are likely to be put to for the name and cause of Christ, and labour for a holy stability of mind, for encountering it if it should come upon you. Things certainly fall the lighter on us, when they fall first upon our thoughts. In this way, indeed, of an imagined suffering, the conquest beforehand may be but imaginary, and thou mayest fail in the trial. Therefore, be still humble and dependent on the strength of Christ, and seek to be previously furnished with much distrust of thyself, and much trust in him, with much denial of thyself, and much love to him; and this preparing and training of the heart may prove useful, and make it more dexterous, when brought to a real conflict. In all, both beforehand, and in the time of the trial, make thy Lord Jesus all thy strength. That is our only way in all to be conquerors, "to be more than conquerors, through Him, that loved us," Rom. viii. 37.—*Leighton.*

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### ETERNITY.

Whence, my brethren, do you derive your confidence, that your dying day is so remote? From your youth? Yes, you reply; I am as yet only twenty—thirty years old. Ah! you completely deceive yourselves. No, it is not that you have advanced twenty or thirty years, but that death has gained twenty or thirty years upon you: God has given you thirty years of grace, by suffering you to live: you are his debtor for these years; and they have brought you so much the nearer to that term, when death awaits you. Take heed, then; eternity already marks upon your brow the fatal instant in which it will begin for you. Eternity! Ah! know you what it is? It is a time-piece, whose pendulum speaks, and incessantly repeats two words only, in the silence of the tomb—ever, never—never, ever—and for ever.

During these fearful vibrations, a reprobate cries out, "What is the hour?" And the voice of a fellow-wretch replies—"Eternity!"—*Bridaine.*

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### HEAVEN.

Death, to the saints, is not so much a penalty as it is a remedy. It delivers them up, and lets them into such joys, as "eye hath not seen, nor ear heard, neither hath entered into the heart of man to conceive." Yea, a man may as well with a coal paint out the sun in all its splendour, as with his pen or tongue express, or with his heart, were it deep as the sea, conceive, the fulness of those joys, and sweetness of those pleasures, which the saints shall enjoy at God's right hand for evermore. For quality, they are pleasures: for quantity, fulness: for dignity, at God's right hand: for eternity, for evermore: and, millions of years multiplied by millions, make not up a minute to this eternity.—*Younge.*

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# THE
# WEEKLY VISITOR.

NUMBER CXXXI.] TUESDAY, MARCH 3, 1835. { PRICE ONE HALFPENNY

EASTERN HOMAGE.

## SCRIPTURE ILLUSTRATIONS. No. XIV.

"His enemies shall lick the dust."—Psa. lxxii. 9.

THIS psalm, considered by eminent critics as written by David for Solomon, is generally, if not universally acknowledged, by writers on the Bible. to have a reference to the Messiah's kingdom, since many things in it could only be strictly true of Christ; its duration as long as the sun and moon, the subjection of all kings to its authority, the happiness of all its subjects, and the universal honours of the King, admit of no other application; so that, if written in honour of the illustrious king of Israel, "a greater than Solomon is here."

The language expressed in the passage above given, is descriptive of the ultimate subjection of Christ's foes to his supreme authority, whether we consider them as voluntary servants bowing before him, and subdued by his mercy, or involuntary, and so forced to bend beneath his power. The allusion of this passage is to the obsequious reverence with which an eastern monarch is approached.

Mr. Hugh Boyd, in his account of his embassy to the king of Candy, in Ceylon, describes the manner in which his companions approached him. "They almost literally licked the dust; prostrating themselves with their faces almost close to the stone floor, and throwing out their arms and legs."

The lower class of people in Japan also observe a profound silence when their princes pass, and fall prostrate on the ground, in order to show their respect." So with the Turks, as soon as an ambassador sees the sultan, whether at the window or elsewhere, he immediately falls down on his knees, and kisses the ground.

J. C.

### INSECTS.—No. XXXIV.

*(Remarkable Differences.)*

"THE world, by difference, is in order found." In every direction diversity is apparent, and that which prevails among the insect tribes, ought not to be overlooked. Among them, for instance, contrary to what generally occurs in vertebrate animals, the size of the female is almost constantly larger than that of the male. Even in the larva and pupa states, a practised eye can judge, from their greater size, which individuals will become females. There are, however, some exceptions to this rule The size of the female in ordinary cases seems connected with her office as a mother, that sufficient space may be allowed for the vast number of eggs she is to produce; and though, in the majority of cases, the disproportion between the two sexes is not very considerable, yet in some few it is enormous. Reaumur mentions a beetle, the male of which is so small compared with the female, that a bull not bigger than a sheep, or even a hare, set by the side of the largest cow, would aptly show the contrast. The female of many gall-insects is so large compared with the male, that the latter traverses her back as an ample area for a walk. But this is nothing compared with the prodigious difference between the sexes of termesfatale, and other species of white ants, whose males are often many thousand times less than the females, when the latter are distended with eggs. When the business of oviposition commences, they take the eggs from the female, and place them in the nurseries prepared for their reception. Her abdomen now begins gradually to extend, till in process of time it is enlarged to 1500 or 2000 times the size of the rest of her body, and her bulk equal to that of 20,000 or 30,000 workers. This part, often more than three inches in length, is now a vast mass of eggs, making long circumvolutions through numberless slender serpentine vessels; which, like the undulations of water, produce a perpetual rise and fall over the whole surface of the abdomen, and occasion a constant extrusion of the eggs, amounting sometimes in old females to sixty in a minute, or eighty thousand and upwards in twenty-four hours. As these females live two years in their perfect state, how astonishing must be the number produced in that time!

In some species, the sexes are either partly or wholly of a different colour. In the common libellula depressa, which may be seen hawking over every pool, the abdomen of the male is usually slate colour, while that of his partner is yellow, but with darker side spots. Reaumur, however, noticed some males that were of the same colour with the females. Schelver observed when he put the skins of these insects into water, that the colours common to both sexes were in the substance of the skin, and remained fixed; while those that were peculiar to one, could be taken off with a hair pencil, and coloured the water; which, therefore, were superficial, and, as it were, laid on. The yellow males, therefore, that Reaumur observed, were probably such as had the superficial blue colour, which distinguishes them, washed off. In one case, the males are of a lovely silky blue, and the females green; in another the male is wholly black, and the female wholly grey, and of so very different an aspect, that they were long regarded as distinct species.

The sexes of insects vary also in their sculpture. Thus the wing cases of the females of many of the larger water-beetles are deeply furrowed, while those of the males are quite smooth and level; and the thorax of the female in several species of colymbetes of the same tribe, has on each side several tortuous impressed lines or scratches, like net work, which are not to be discovered in the male.

The legs of some bees are distinguished in the sexes, by a difference in their clothing. A singular apparatus has been given to the worker-bees for the purpose of carrying the propolis, (a brown, odoriferous, resinous substance, more tenacious and extensible than wax, and well adapted for cementing and varnishing,) as well as the pollen of flowers, to the hive. The shin, or middle portion of the hind pair of legs, is actually formed into a triangular basket, admirably adapted to this design. The bottom of this basket is composed of a smooth, shining, horn-like substance, hollowed out in the substance of the limb, and surrounded with a margin of strong and thickly set bristles; a structure belonging only to the females and neuters, and which will be in vain looked for in the male. Whatever materials may be placed by the bee in the interior of this basket, are secured from falling out, by the bristles around it, whose elasticity will even allow the load to be heaped beyond their points without letting it fall.

Mr. Knight caused a part of a tree stripped of the bark to be covered with a cement, composed of bees'-wax and turpentine, and he observed that this was frequented by hive-bees, who, finding it to be a very good propolis ready made, detached it from the tree by their mandibles or jaws, and then, as usual, passed it from the first leg to the second, and so on. When one bee had thus collected its load, another often came behind and took it away; a second and third load were lost in the same manner; thus furnishing, perhaps, an instance of the division of labour which is so strikingly exemplified in every part of the economy of bees.

It is also worthy of remark, that when the bee is loading her singular basket, she first kneads the piece she has detached with her mandibles, till it becomes somewhat dry, and less adhesive, as otherwise it would stick to her limbs. This preliminary process sometimes occupies nearly half an hour. She then passes it backwards by means of her feet, to the cavity of her basket, giving it two or three pats to make it adhere; and when she adds a second portion to the first, she often finds it necessary to pat it still harder. When she has procured as much as the basket will conveniently hold, she flies off with it to the hive, unless relieved of it in the way that has just been described.

With regard to the general shape of their body, the male and female usually resemble each other: but here also there are some cases of difference. The male of the hive-bee is much thicker and more clumsy than either the female or the worker; but in one tribe of insects, the males are nearly cylindrical in shape, and very narrow, while the other sex are oblong or ovate; and in another the male is long and slender, and the female short and thick; which, in more than one instance, has occasioned their being mistaken for distinct insects.

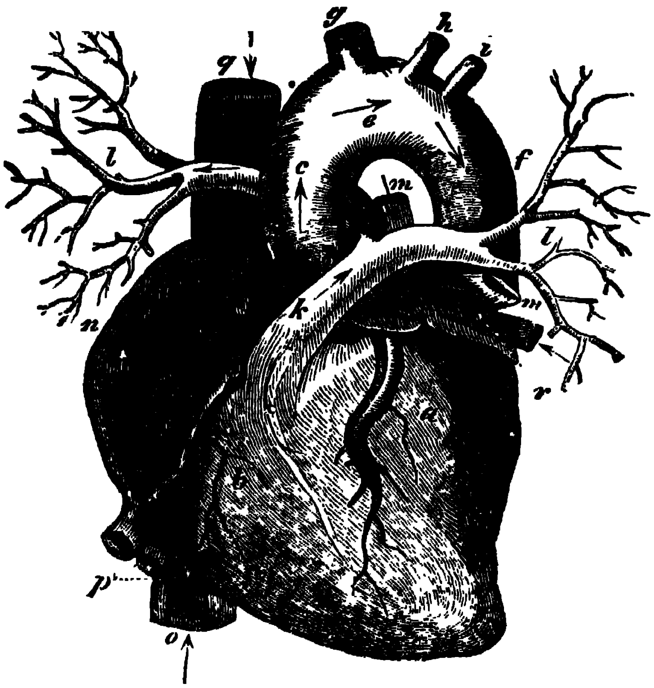
In concluding this account, the differences in the structure of particular parts and organs must be briefly noticed. The male stag-beetle not only exceeds the female in the length of his mandibles, but also greatly in the size and dimensions of his head. Some males have threatening horns, usually hollow, which give them some resemblance to many of the larger quadrupeds. Many are unicorns, and have their head armed with only a single horn; others, like the he-goat or the stag, have a pair of horns; others go beyond any known quadrupeds in their number of horns. In reference to the antennæ, the advantage seems to be wholly on the side of the males; since in them these wonderful instruments of unknown sensations are not only more complex, but usually more elegant than those of the other sex. Some antennæ assume an appearance of plumes—not from the branches that proceed from them, but from the fine long hairs that beset and adorn them. These are universally indications of the male sex; those of the females being generally comparatively naked.

In the female of the common glow-worm not the slightest vestige of wing-cases or wings is visible, and the creature resembles a larva rather than a perfect insect; yet its mate is a true beetle, furnished with both. For the chirping of the cricket tribe, produced by the friction of the basis of their elytra, or wing-cases, against each other, there is something peculiar in their structure. These parts of both sexes are divided lengthways into two portions; a vertical or lateral one which covers the sides, and a horizontal one which covers the back. In the female both these portions resemble each other in their nervures, which, running obliquely in two directions, form, by their intersection, numerous small lozenge-shaped meshes or areolets. The elytra also of these have no elevation at their base. In the males the vertical portion does not materially differ from that of the females; but in the horizontal the base of each elytrum is so elevated as to form a cavity beneath. The nervures also, which are stronger and more prominent, run here and there very irregularly, with various inflexions, describing curves, spirals, and other figures difficult and tedious to describe, and producing a variety of areolets of different size and shape, but generally larger than those of the female: particularly towards the extremity of the wing may be observed a space nearly circular, surrounded by one nervure, and divided into two areolets by another.

But here we may pause. With truth, has it been said

> .......... "Each crawling insect holds a rank
> Important in the plan of Him—who framed
> This scale of beings; holds a rank which, lost,
> Would break the chain, and leave a gap behind
> Which nature's self would rue."

And that an alteration in the appointed circumstances of any one would be attended with incalculable disadvantage, is equally certain.



## ON THE HEART, AND CIRCULATION OF THE BLOOD.—NO. I.

In former numbers of the *Weekly Visitor* we have endeavoured to give a brief description of several interesting organs of the animal frame: we have dwelt upon the structure and properties of the eye, the ear, and the hand; and we are now about to explain, as simply as possible, the mechanism by which the vital fluid is carried through thousands of channels, so as to traverse every portion of the body, giving warmth, health, and animation to our tenements of clay: "for the blood is the life thereof." We are, in fact, about to describe the structure of the heart and blood-vessels, and the general plan of the circulating system.

Life is a wonder; the laws of life are based upon a principle which is beyond the sphere of our comprehension, and all the operations of living bodies proclaim, in the most direct and forcible manner, the agency of God, who alone could have formed, who alone can maintain, who alone understands that mystery. It is a mysterious principle which, though it eludes the anatomist's knife, yet resides in every fibre, in every nerve, in every globule of blood, while circulating in the body; it is something which gives the nerves their feelings, the fibres their powers of contraction, and which converts the nutriment we take into warm and living blood. Who can explain what is life? The more we try, the more are we lost in wonder. Can the most gifted sage boast that he has entered into the arcana of nature? Can the wisest man create the meanest insect, or reanimate its no longer vital frame, or recall and reunite its elementary particles, and say, *Live?* No. But there is One who can; there is One who has done this, and more: it is He who said, "Let there be light, and there was light;" who created man, and all living things by his Word,—that Word, which in the beginning "was with God, and was God, and without which was not any thing made that was made."

But though life, abstractedly considered, must ever remain a mystery, the operations of living bodies, upon which their organic existence immediately depends, are, to a certain point, within our powers of investigation, and offer, to the reflective mind, subjects of the highest interest. One of these operations of vitality is the circulation of the blood, to understand which, we must first become generally acquainted with the agents by which it is effected. These are the heart, the arteries, and the veins, the two latter being often denominated, in general terms, blood-vessels.

In man, together with the rest of the mammalia, and in birds, the heart is formed on one general plan; but when we pass to reptiles, fishes, and the lower orders of animate beings, we find it very variously modified.

Our observations will mainly apply to warm red-blooded vertebrata, that is, mammalia and birds.

The heart, then, is a large hollow muscle, internally divided into four cavities.

In the mammalia it is situated in the chest, between the lungs, and enfolded in a membranous bag, technically called the *pericardium*. In birds, there is no chest properly so called, and the lungs are not loose, but attached to the vertebræ and ribs, filling up the hollows between the ribs; the heart, therefore, in this order, is not placed exactly in the same relative situation as in the mammalia, and it further differs also in one or two points of structure. Our purpose, however, is not to enter into minutiæ, but to generalize as much as possible.

The four cavities of the heart are as follows:—a right auricle, and a right ventricle, a left auricle, and a left ventricle.

The auricles are small hollow earlike appendages, with their muscular walls, possessing little strength, or power: they seem, indeed, to be rather dilatations of the veins which terminate in them, than separate and distinct cavities. In our sketch above, they are marked as follows:—*n* the right, *r*. the left. The ventricles constitute the great mass of this organ; their walls are thick and muscular, but not in an equal ratio; the *parietes* of the right ventricle (which has only to send the blood to the lungs) being the weakest, while those of the left ventricle (whence the blood is sent to the uttermost parts of the body) are of enormous strength and thickness. The ventricles are not separated externally, in so distinct a manner are the auricles, but the boundary line between them is marked by veins and arteries, which may be observed running down the heart to its point or *apex*. The ventricles are marked as follows:—*b*. the right, *a*. the left.

The remainder of the parts to be noticed in the sketch of this organ are as follows:

*c*. *c*. *f*. The aorta, arising from left ventricle.

*g*. *h*. *i*. Arteries branching from it, going to the head and neck: *g*. the artery innomerata, *h*. and *i*. the left carrotid, and subclavian.

*k*. The pulmonary artery.

*l*. *l*. Its branches on the lungs.

*m*. *m*. Pulmonary veins, bringing back the blood from the lungs into left auricle [illegible].

*o*. Ascending *vena cava*, bringing back the blood of the lower parts into right auricle *n*.

*p*. Veins entering the *cava*.

*q*. Descending *vena cava* bringing back blood from upper parts of body, into right auricle *n*.

The reader will refer as he proceeds to our engraving.

There is no direct communication, in the mature condition of mammalia, between the right and the left cavities of the heart, the blood having to pass through the lungs, from the right, before it can reach the left portion of the heart; hence such a heart is said to be double, in reference to what we find it to be in the lower orders of animals. The right portion is called the *pulmonic*, because from thence the blood received from the body is carried to the lungs; the left, the *systemic*, because the blood returned from the lungs, is thence sent out to the body at large, for its nutriment, and the maintenance of its organic functions. This, however, will be better understood when we shall have described the cavities of the heart a little more in detail, and followed the course of the circulating fluid through the arteries and the veins.

M.

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## MEDICAL PROPERTIES OF ARALIACEOUS PLANTS AND SHRUBS.

The *Aralia*, or angelica-tree, the type or representative of this order of plants and shrubs, received its latter name from the resemblance which its round clusters (umbels) have to those of the angelica. The fruit, however, is not a twin seed, as in the angelica, but a five celled berry, which is striped or marked with indented lines, and, being surmounted by a permanent calyx, it affords a ready mark for discrimination, independent of other notes of difference between a shrub and an herbaceous plant. Several species of this genus are, by the natives where they grow wild, treated as simples, and have obtained some reputation for their efficacy in dropsical diseases.

The *Aralia Palmata*, or palmate-leaved angelica-tree, a native of China, produces a bark which is used by the Chinese as a medicament in dropsies and diseases of the skin. This shrub climbs like the ivy; bears palmate, or five-lobed leaves, (so as to have a certain resemblance to the hands when the fingers are spread out,) and a cluster of white flowers.

*Aralia Nudicaulis*, or naked-stalked angelica-tree, is a native of Canada or Virginia. It has a very short stem, with leaves elegantly divided; the flowers are in clusters, like those of our common ivy. The inhabitants of Canada use the roots of this species instead of sarsaparilla, the root of which has been proved, by many trials, to have a good effect in cases where the sharpness or acrimony of the fluids occasions a derangement of the external surface of the body. There appears to be a strange correspondence between that state of the system which produces dropsy, and the state of the skin. One of the Sandwich Island Chiefs, who was a sincere friend to religion and the missionaries, was afflicted with this malady, and subject to an unsightly disorder in the legs, which is endemic or local in that group. As the time for affording a temporary relief by the customary operation drew near, the sores upon the legs broke out, rankled, and discharged, and presented a most "lazar-like" and revolting appearance. But within a short time after the operation, the legs, which had so lately offered a piteous illustration of Isaiah, i. 6, were healed, and only reminded us of their former condition by discoloured patches, powdered with a scurfy whiteness. We have told this short story, as it proves, without any pathological or recondite reasoning upon the subject, that the same medicine may be useful among the inhabitants of one place for the dropsy, where it is common, and in another, for a disease of the skin, from the connexion that is seen to obtain between them. We are therefore justified in saying, that these two plants just mentioned have nearly, if not entirely, the same effect; which is worthy of remark, for in stem and foliage they differ greatly, but in the nature of their flowers they are essentially the same.

The virtues of the *Panax Quinquefolium*, or Gin-seng, have been already alluded to, under that head, in No. III.

*Hedera Helix*, common ivy. The ivy, according to Dioscorides, is useful in all kinds of ulcer. The leaves boiled in wine are good for a discoloured and sun-burnt skin; properties very similar to which we have just seen the Canadians ascribe to an associate of the ivy, the aralia nudicaulis. The powdered berries of the ivy, when ripened to dryness, were formerly exhibited in large doses, as a remedy against the plague. The same authority quoted above, recommends it in diseases of the nostrils, and as an antidote against the bite of the tarantula. The ivy was worn in a wreath about the head by bacchanalians, doubtless on account of its flourishing in bloom and greenness when most other shrubs sicken from the inclemencies of winter; for wine, in the flustered imagination of a drunkard, imparts youth, health, and beauty, with every goodly and prosperous gift. The burden of jovial songs is, that while sober-minded persons are fading with care, the lover of wine is always green and fresh. Such wretched dupes of their own deceivings are the votaries of jollity and good-fellowship. The ivy was not the only material in the composition of this crown, but the vine branches and various kinds of flowers were employed for the same purpose. If the reader will be pleased to turn to Isaiah xxviii. 1, he will find an allusion to this practice; and, in the following verses, a severe reproof to wine bibbers. Porcius Cato, who fought, at the age of seventeen, in the war against Hannibal, and was himself the pattern of domestic economists, teaches us, in rule CXI. in his work on rustic affairs, how to find by experiment when wine has been diluted with water. "If you would know," says he, "whether water has been put to the wine or not, make a small vessel of the wood of the ivy, then pour that wine which you suppose has water into it. If it has water, the wine will flow out, the water remain; for a vessel made of the ivy wood will not hold wine." Porcius Cato most likely gave this recipe upon the credit of others, without an experiment; for since his time, Olaus Wormius actually put the precept to its trial, but it was found that not only wine leaked through the spongy wood, but the water also, to bear it company. The ivy yields a gum resin, which is sometimes imported and sold in the shops. It is obtained in the usual way, by wounding the stem, when the gum resin oozes out, and congeals about the wound. If the top of the germen or unripe fruit be examined while it is in flower, a number of minute drops will be seen upon it, as we have stated in our description of this shrub. See Hedera, No. III. The dew just described is doubtless a gum resin, and offers a connecting link between the araliaceous and umbelliferous plants.

## MUSICAL TALENTS OF SAMUEL WESLEY.

Samuel Wesley gave some astonishing proofs of his love for music when quite a child. The following is abridged from the Methodist Magazine, where some anecdotes of his early life are given as stated by his father, the Rev. Charles Wesley.

While his brother Charles was playing,

Samuel used to stand by, with his childish fiddle, scraping and beating time. The first tunes he aimed at, were the King's Anthem and Fischer's Minuet, which he picked up from the street-organ players, when he was about three years of age.

Whenever Mr. Kelway came to teach Charles, Sam constantly attended, and accompanied Charles on the chair. If his brother ever began playing his lesson before Sam was called, he would cry and roar as if he had been beaten. When Mr. Arnold heard him at the harpsichord, he said, "I set down Sam for one of my family." Whenever he heard his brother begin to play, he could tell whose music it was, (whether Handel, Corelli, Scarlatti, or any other;) and what part of what lesson, sonata, or overture.

When he was about eight years of age, Dr. Boyce called on his father, saying, "Sir, I hear you have got an English Mozart in your house;" adding, that he had been told wonderful things of him. A piece of music of Samuel's composition was shown to the doctor, who looked over it very carefully, "These airs are certainly some of the prettiest I have seen. This boy writes, by nature, as true a bass as I can by rule and study."

After this he was much taken notice of, playing voluntaries on the organ; delighting many companies for hours together with his own music; and playing the first violin at private concerts. He was, also, every where as much admired and loved for his behaviour, as for his skill in music.

"If he loved any thing better than music, it was regularity. He took to it himself. Nothing could exceed his punctuality. No company, no persuasion, could keep him up beyond his time. He never could be prevailed on to hear any concert by night. The moment the clock gave warning for eight, away ran Sam, in the midst of his most favourite music. Once he rose up, saying, "Come, Mamma, let us go home, or I sha'nt be in bed by eight." When some talked of carrying him to the Queen, and I asked him if he was willing to go, "Yes; with all my heart," he answered; "but I won't stay beyond eight."

The praises bestowed so lavishingly upon him did not seem to affect, much less to hurt him; and whenever he went into the company of his betters, he would much rather have stayed at home; yet, when among them, he was free and easy; so that some remarked, "He behaves as one bred up at court, yet without a courtier's servility."

In addition to the above, the Hon. Daines Barrington gives some further particulars respecting this extraordinary boy. He first saw him when he was nearly ten years of age; and he states, that he was then able to execute the most difficult lessons for the harpsichord at sight, and that his fingers never wanted the guidance of the eye in the most rapid and desultory passages. He could execute the most crabbed composition at sight: his abilities in this way were once put to a severe test. An old composition, supposed to have been composed by Queen Elizabeth, which none of the harpsichord masters could perform, was taken to him. Samuel immediately placed it on his desk, and, although he allowed, that there were two or three passages which he could not play at sight, as they were "so queer and awkward," yet he said he had no notion of not trying. He boggled at these "queer and awkward parts" the first time, but executed them clearly at the second practice.

His judgment as to the merits or defects of musical composition, was also very acute and correct. Lord Mornington once said, that he always wished to consult Master Wesley upon any difficulty in composition, as he knew no one who gave such immediate and satisfactory information.

An instance of the delicacy of his feelings may now be stated. He had been desired to compose an easy melody in the minor third, for an experiment on little Crotch; and that he would go to hear what that very extraordinary child was capable of. Crotch was not in good humour; and Master Wesley submitted, amongst other things, to play upon a cracked violin, in order to please him; the company, however, having found out who he was, pressed him very much to play upon the organ, which Sam constantly declined. As this was contrary to his usual readiness in obliging any person who had the curiosity to hear him, he was afterwards asked what might be the occasion of his refusal; when he said that it would look like wishing to shine at little Crotch's expense.

It would appear, also, that this youthful musical genius was able to sing at sight from the time of his first knowing his notes. We shall conclude our notice with an anecdote related of him by the Hon. Daines Barrington:—

"He was desired to compose a march for one of the regiments of guards; which he did to the approbation of all that ever heard it; and a distinguished officer of the royal navy declared that it was a movement which would probably inspire steady and serene courage when the enemy was approaching. As I thought the boy would like to hear this march performed, I carried him to the parade at the proper time, when it had the honour of beginning the military concert. The piece being finished, I asked him whether it was executed to his satisfaction; to which he replied, 'By no means.' I then immediately introduced him to the band, (which consisted of very tall and stout musicians,) that he might set them right. On this Sam said to them, 'You have not done justice to my composition.' To which they answered the urchin with both astonishment and contempt, by, 'Your composition!' Sam, however, replied with great serenity, 'Yes, my composition!' which I confirmed. They then stared, and severally made their excuses, by protesting that they had copied accurately from the manuscript which had been put into their hands. This he most readily allowed to the hautbois and bassoons, but said that it was the players on the French horns that were in fault; who making the same defence, he insisted upon the original score being produced, and, showing them their mistake, ordered the march to be played again; which they submitted to with as much deference as they would have shown to Handel."

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### HORSEMONGER JAIL.

It was on the sabbath day, that, passing by the end of a street, a crowd engaged my attention. Thinking it probable that some one was preaching in the open air to the multitude, I moved towards the throng, but soon found that the people assembled together were of a very different description to those who hear the word gladly, or hunger and thirst after eternal life. A reckless crowd of persons, mostly young, was assembled, and the loud laugh of thoughtless folly, the horrid oath of the daring blasphemer, and the coarse ribaldry of the profane, were blended together. There were some persons, apparently, drawn to the spot by mere curiosity; but they formed an exception only to that concourse of sabbath breakers, who, by turns, chaffered with the Jew-boys for their oranges, played at leap-frog, excited their dogs to fight, or quarrelled with each other.

Being a stranger to the place, I asked a by-stander the cause of the crowd, when he significantly pointed to the roof of the large building, exactly opposite the throng. It was Horsemonger Jail, on the top of which was erected a gallows, ready for the execution of a murderer on the morrow morning.

Thus, on the sabbath-day, with the gallows before their eyes, whereon, in less than twenty-four hours, a wretched being would end a guilty life by enduring a miserable death, this throng was assembled together in all the thoughtlessness of unsubjugated mirth, and the hardiness of the most obdurate impiety. "Lord, what is man!"

◆

### TROUBLE.

"I will be with him in trouble." Ps. xci. 15.

Many remarkable facts are recorded in Scripture, verifying the truth of this promise. God was with faithful Abraham to comfort and sustain him under all the trials of his pilgrimage, and encourage him "to look for a city that had foundations:" he was with Daniel in the time of extremity, to stop the mouths of lions: he was with Job, so that he exclaimed, "I know that my Redeemer liveth:" he was with David, and enabled him to say, "though I walk through the valley and shadow of death, I will fear no evil." He has been to his people in all ages that are past, and he will be in those which are to come, "a very present help in time of trouble." This is the christian's privilege, that this God is his God, and he will guide him in life's intricate path—he will be a refuge for him in the day of adversity—he will be his solace on the bed of affliction—and in death he will be with him, to calm the swellings of Jordan—to dispel the gloom, and to animate him with the blessed hope of celebrating for ever the praises of God and the Lamb in the realms of bliss and immortality.

Studiosus.

How to Live.—Live not so much upon the comforts of God, as upon the God of comforts, Psalm lxiii. 3.

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THE

# WEEKLY VISITOR.

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THE SNOW-DROP.

## THE SNOW-DROP.

*(Galanthus nivalis.)*

WHY does the snow-drop, "the morning star of flowers," put forth its pretty blossoms amidst the chills of frost and cold weather? Not surely for the mere purpose of furnishing poets with a theme to string verses upon, or a subject for figures of speech; though many of these we must allow to be finely conceived, and elegantly introduced, such as that of M. Robinson:

> Where'er I find thee, gentle flower,
> Thou still art sweet and dear to me;
> For I have known the cheerless hour,
> Have seen the sun-beams cold and pale,
> Have felt the chilling wintry gale,
> And wept and shrunk like thee.

Or that of Mrs. Tighe, who describes the snow-drop, as

> The wintry flower,
> That whiter than the snow it blooms among,
> Droops its fair head submissive to the power
> Of every angry blast which sweeps along,
> Sparing the lovely trembler, while the strong
> Majestic tenants of the leafless wood,
> It levels low. PSYCHE.

And no less pretty are the lines of another female writer, Mrs. Charlotte Smith, who describes the flower.

> Like pendent flakes of vegetating snow,
> The early herald of the infant year;
> Ere yet the adventurous crocus dares to blow,
> Beneath the orchard boughs thy buds appear.
>
> While still the cold north-east ungenial lowers,
> And scarce the hazle in the leafless copse
> Or sallows show their downy powdered flowers,
> The grass is spangled with thy silver drops.
>
> Yet when those pallid blossoms shall give place
> To countless tribes of richer hue and scent,
> Summer's gay blooms, and Autumn's yellow race,
> I shall thy inodorous bells lament.
>
> So journeying onward in life's varying track,
> Even while warm youth its bright illusion lends,
> Fond memory often with regret looks back
> To childhood's pleasures, and to infant friends.

That the snow-drop has been destined by Providence for some more useful purpose than to be thus exhibited in poetry, can require, we think, no argument to prove; though we may not in this, as in numberless other instances in creation, be able to point out the precise design intended by Providence in the early blooming of the snow-drop.

We have just met with the following chance incident, which we conceive may throw some light on this subject.

Walking in a garden, during one of the spring-like days, which were so common, during the early part of 1834, we observed on a snow-drop blossom, a very uncommon insect for this season of the year—a wall-wasp, (*odynerus murarius,*) one of the solitary species, of a dark glossy black colour, crossed with narrow bands of a pale golden yellow. The poor thing appeared to be very sluggish and languid, benumbed, no doubt, by the cold, though partially revived by the bright sunshine, which was then streaming over the opening blossoms of clumps of snow-drops and primroses, planted at intervals in the borders. We will not assert, that this feeble wall-wasp actually found any sip of honey in the snow-drop blossom; for though such is very probable, it is always hazardous to conjecture without actual observation, respecting the actions of creatures, which are directed either mediately or immediately by Him "who worketh by means, and contrary to means," but it led us to believe this conjecture at least plausible.

And may it not be, (we went on to suppose,) that the early blowing of the snow-drop, as well as the late blowing of the ivy, and some other plants, is destined to spread a table in the wintry wilderness for such insects as may, like our poor wall-wasp, have accidentally survived the general destruction of their kindred on the first setting in of cold weather; or such insects as the hive bees which may chance to be roused from their torpid sleep, by weather milder than usual, or by an occasional day of sunshine? Many insects, in such circumstances, do certainly perish, as do summer insects by some tempests, and as cities are destroyed by earthquakes; but it is at least pleasing to reflect, that the snow-drop, and a few other flowers of its companionship, may be serviceable to prevent a few bees, wasps, and similar insects from perishing of absolute famine. Such a reflection, indeed, to our mind, throws a brighter interest around the snow-drop, than all the poetry that was ever written in its praise; and we think it will do so to the minds of all those who are accustomed even in an incident so apparently trivial as seeing an insect resting on a flower, to "look through nature, up to nature's God."

## MELANCHOLY EFFECTS OF SUDDEN FRIGHT.

To indulge in the disposition, too prevalent among many, to excite sudden terror or alarm in the breasts of others, is highly criminal. A moment's consideration must convince us, that what may pass off as a harmless jest when practised on one of a bold spirit, may produce the most disastrous consequences when applied to another of a timorous disposition or nervous frame.

Various have been the afflictions of a permanent nature, brought on the young and the fearful, by a wanton or thoughtless attempt to frighten them. Surely many who indulge in this mischievous propensity, merely through a love of frolic, would put a restraint upon themselves if they were at all aware of the possibility of entailing an infirmity on a fellow-creature, only to be relieved in the final hour, when this mortal shall put on immortality.

In a new work, published on the diseases of the ear, two instances are related wherein sudden fear produced the most melancholy effects. The one was that of a child, who, being thoughtlessly frightened by an elder sister, was affected with total deafness. In the second case the consequence was yet more fearful; for the little sufferer, terribly alarmed at being put into a dark cellar, by a servant, became not only totally deaf, but totally blind also!

Think, reader, of the delight afforded by the view of rising and setting suns, of the varied objects of creation, and of the faces of our dearest friends! Think of the pleasure and profit to be derived from books, especially the book of books, the Bible. Think of the delight communicated by soothing music, the singing of birds, the soft voices of affectionate friends, and the cheering consolations of the promises of eternal life, breathed forth with heartfelt energy, by the ministers of the gospel of peace; and then ask yourself, if the poor gratification of a momentary pleasure, would recompense you for the stinging remorse your heart would feel in the bitter consciousness of having deprived a human being of these advantages for ever.

Another melancholy instance of the sad effects of sudden fright, is that of a school-boy who was lifted up in bed, in the dark, by one of his companions, who, unknown to him, had crept under the bed for that purpose. The frightened boy, terrified to distraction, lost his senses, and became an incurable lunatic.

Reader! Think of the immeasurable mercy that your heavenly Father has manifested towards you, in bestowing upon you faculties, whereby you may, in part, comprehend the wonders of his Providence, and his grace, and ask your own heart, whether if you had deprived a human being of these inestimable advantages, you would be satisfied in reflecting that you did it in a moment of thoughtless folly?

If you have the slightest disposition to indulge in so censurable a sport, and do not endeavour to restrain it when apprized of the dreadful consequences that may attend it, you must have a weak head, and a hard heart. Many thoughtless follies of this kind are committed for want of due reflection; but after the danger has been pointed out to us, we must be wantonly cruel, to persevere therein. Who, but a monster of inhumanity, could stand over the grave of one who had been the victim of his inhuman sport, and repeat, without aggravated remorse, the words, "Here lies the dust of a fellow-being, rendered wretched by my reckless folly. Robbed of the blessings of sight and hearing, and despoiled of the still more precious gift of understanding, he lingered through the darksome days of his earthly pilgrimage, a spectacle of incurable affliction, and a memorable example of the fatal consequences of my infatuated folly?"

◆

## CONSCIENCE.

When the conscience is thoroughly afraid with the remembrance of sins past, and the devil assaileth thee with great violence, going about to overwhelm thee with heaps, floods, and whole seas of sins, to terrify thee, and draw thee from Christ, then arm thyself with such sentences as these: Christ, the Son of God, was given, not for the holy, the righteous, worthy, and such as were his friends; but for the wicked sinners, for the unworthy, and for his enemies. Wherefore, if Satan say, Thou art a sinner, and therefore must be damned; then answer thou, and say, Because thou sayest I am a sinner, therefore will I be righteous and be saved: and if he reply, Nay, but sinners must be damned; then answer thou, and say, No; for I fly to Christ, who hath given himself for my sins; and therefore, Satan, in that thou sayest I am a sinner, thou givest me armour and weapons against thyself, that with thine own sword I may cut thy throat, and tread thee under my feet. Matt. xi. 28; Rom. v. 6, 8.—*Luther.*

## ADVANTAGE OF KNOWLEDGE.

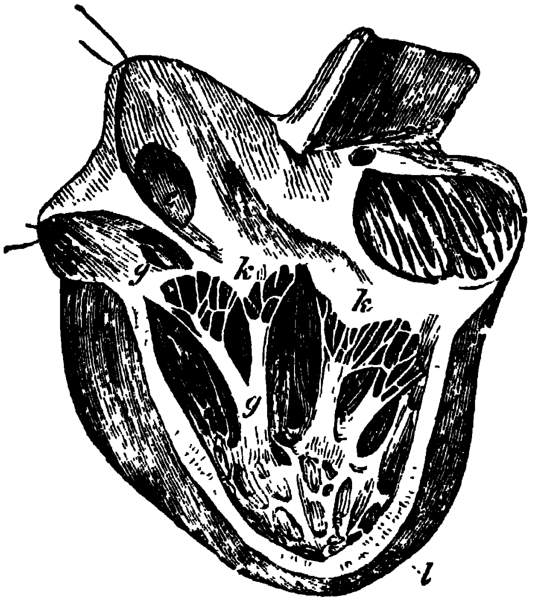
In England, a man of small fortune may cast his regards around him, and say, with truth and exultation, "I am lodged in a house that affords me conveniences and comforts, which even a king could not command some centuries ago. There are ships crossing the seas in every direction, to bring me what is useful to me from all parts of the earth. In China, men are gathering the tea-leaf for me; in America, they are planting cotton for me; in the West India Islands, they are preparing my sugar and coffee; in Italy, they are feeding silk-worms for me; in Saxony, they are shearing the sheep to make me clothing; at home, powerful steam-engines are spinning and weaving for me, and making cutlery for me, and pumping the mines, that the materials useful to me may be procured. My patrimony was small, yet I have post-coaches running day and night, on all the roads, to carry my correspondence; I have roads, and canals, and bridges, to bear the coal for my winter fire; nay, I have protecting fleets and armies around my happy country, to secure my enjoyments and repose. Then I have editors and printers, who daily send me an account of what is going on throughout the world, among all these people who serve me. And in a corner of my house, I have books! the miracle of all my possessions, for they transport me instantly, not only to all places, but to all times. By my books, I can conjure up before me, to vivid existence, all the great and good men of antiquity; and, for my individual satisfaction, I can make them act over again the most renowned of their exploits; the orators declaim for me; the historians recite; the poets sing: in a word, from the equator to the pole, and from the beginning of time until now, by my books, I can be where I please."—*Dr. Arnott.*

◆

## WAGES OF SIN.

The wages that sin bargains with the sinner are, life, pleasure, and profit; but, the wages it pays him with are, death, torment, and destruction. He that would understand the falsehood and deceit of sin, must compare its promises and its payments together.—*South.*

## ON THE HEART AND CIRCULATION OF THE BLOOD.—NO. II.

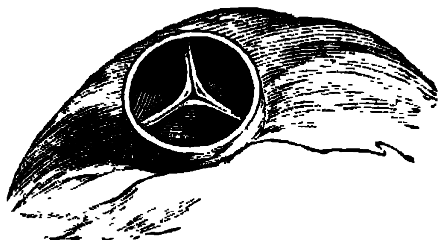


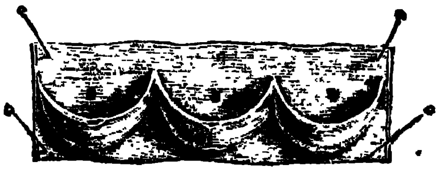
The above is a sketch of the right auricle and right ventricle laid open; showing *g.* the corneæ columnæ with their tendinous chords; *k.* the tricuspid valve; *e.* the obliterated *foramen ovale*,(open before birth, but closed afterwards,) which communicated between the two auricles.

The right auricle of the heart is the immediate receptacle for the blood, which, having accomplished its course, is returned back to that organ, in order to be first sent to the lungs, whence it returns again to the heart, and is then sent out afresh on its journey through the system. Into this right auricle, the blood is brought by certain veins, (*venæ cavæ, o.q.* page 84,) which terminate in it; and its thin walls are strengthened by bundles of muscular fibres, disposed on its inner surface, and termed *musculi pectinati,* from their resemblance to the teeth of a comb. The division-wall between the two auricles is termed the *septum auricularum.* The right auricle communicates with the right ventricle below, by means of an opening termed *ostium venosum,* at the edges of which, within the ventricle, is situated a valvular apparatus, consisting of thin, firm membrane, divided into three parts, and called the *tricuspid* valve, from a slight resemblance to three spear heads. To the edges of this valvular apparatus small muscles (*carneæ columnæ*) are attached by tendinous cords,(*chordæ tendineæ*) which prevent the membrane from being forced into the auricle. Thus, though the tricuspid valve readily admits the passage of the blood from the right auricle into the right ventricle, it effectually prevents a drop from returning upon the contraction of the ventricle; a circumstance of material importance, and beautifully provided for. The right ventricle, as we have said, is destined to receive the blood from its corresponding auricle, and transmit it to the lungs, in order that it may be subjected to the action of the atmospheric air, taken in at each inspiration, or during breathing.

Now, the vessel arising from this ventricle is an artery, termed the pulmonary, at the root of which, internally, are situated three valves, (the semilunar valves, from their shape,) which allow the blood to pass during each contraction of the ventricle, but prevent its falling back, during the intervals of the contractions, as it would do, but for this exquisite piece of mechanism.

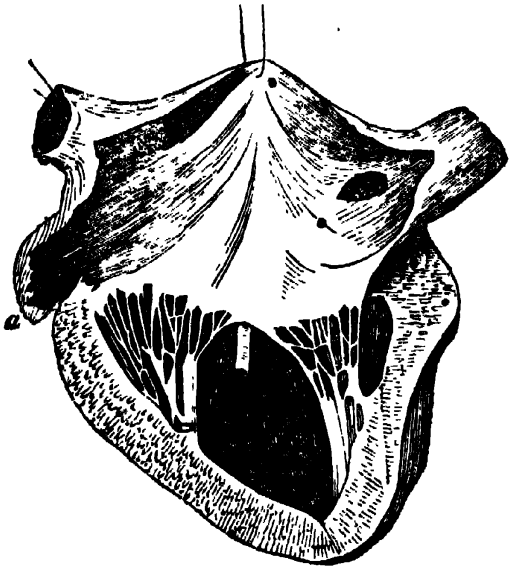
The nature of the valves may be easily imagined from the following sketch, which presents them first in their natural situation, a section of the artery being made just above them, and then as they appear when the artery is slit up longitudinally, and laid extended.





The blood is returned from the lungs to the left auricle of the heart, by four pulmonary veins. The coats of this auricle are somewhat firmer and thicker than those of the right, which in other respects it closely resembles. The opening of the left auricle into the left ventricle, is also furnished with a valvular membrane, but only divided into two parts, and called, from its resemblance to a mitre, *valvula mitralis.* The cut on page 93, shows the left auricle and ventricle, laid open.

The blood received by the left auricle from the lungs, is transmitted through the opening into the left ventricle, which, as it needs the greatest portion of strength, is characterized by the superior thickness and fleshiness of its walls. It is from this fount of life, that the blood is propelled throughout every part of the system, serving to repair the losses of every organ, to build up the animal machine, to maintain vital warmth and energy, to the end that every function may be duly performed, and the body live.



(Left Auricle and Ventricle laid open.)

The great artery which arises from the left ventricle, the ramifications of which (under various names, for the sake of convenience and precision) are distributed universally, is the *aorta.* It is thick and firm, and, like the pulmonary artery, is provided with three semilunar valves.

All the cavities of the heart are lined with a fine smooth membrane, or coat, and externally the whole organ is closely enveloped in a similar membrane, which is a reflection of the internal *lamina* of the pericardium. The pericardium is a membranous bag which contains the heart, but is not adherent to its sides. There is generally found in it a small quantity of serous fluid, which is doubtless of use in lubricating the surface of the heart.

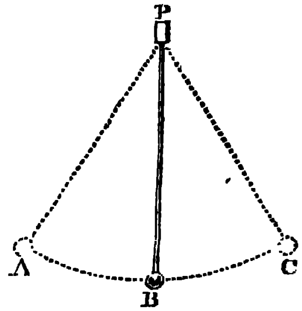
The course of the blood may be thus summarily described: passing from all parts of the body, by means of the veins to the heart, it is received by the right auricle, into which the *vena cava* is perpetually pouring it; the right auricle contracting, propels it through the pulmonary artery to the lungs. Now this artery ramifies most minutely over the thin tissue of which the cells of the lungs are composed, (for the lungs are composed of multitudes of cells, into which the air enters in the action of breathing,) and there acquires new characters which render it subservient to the vital operations of the body; its colour, which was dark, is now altered, and becomes bright florid red, or nearly scarlet. From the lungs it repasses to the heart, by means of veins into which the extreme ramifications of the pulmonary artery gradually merge. These *veins*, named also *pulmonary*, terminate in the *left auricle* of the heart, which, receiving the blood, contracts and transmits it to the left ventricle, and this propels it through the aorta, to every part of the body, where it gradually loses its peculiar arterial properties, which seem as it were to be expended upon the system, and is again taken up by the veins, into which the extreme ramifications of the arteries insensibly merge, to be conveyed to the right auricle, and again go through the process as described.

Thus, then, the right side of the heart is always filled with dark-coloured or venous blood; the left side with bright or arterial blood: the arteries carry the blood from the heart, the veins bring it back; the arteries of the system are filled with bright blood, the veins of the system with dark; while, on the contrary, the pulmonary artery takes blood of a venous character to the lungs; and the pulmonary veins bring back blood of an arterial character to the heart.

M.

### THE PENDULUM, No. I.

The common pendulum is a heavy ball attached to a slight cord or thread, which may be suspended to some fixed point. This instrument, simple as it is, has been employed to determine the direction of the force of gravity, and is still used for the measurement of time. If we place the pendulum P B in any position out of the perpendicular, as P A, and let it fall freely, it will descend to B, and passing this point, will ascend on the other side to C, describing an arc B C, equal to the arc A B; it will then begin to descend, and passing B, ascend again to A. It is scarcely necessary to explain the cause of this motion, for it is evident that when the pendulum descends, its velocity increases till it reaches B, and the accelerated motion it has obtained is sufficient to carry it upwards to C. Gravity, therefore, is the governing force in the vibrations of the pendulum, and in theory, it may be considered a perpetual motion. But there are two causes which tend to destroy the motion and act effectually upon it; these are, the resistance of the air, and the friction of the suspending line upon the point of suspension.



The pendulum employed for philosophical purposes, consists of a metallic weight, usually a heavy disc, so sharp round its circumference, that the resistance of the air can have little effect upon it, and the fine wire that supports it is attached to a piece of sharp steel or knife blade, which rests on plains of polished agates: with these precautions, a pendulum, notwithstanding the resistance of the air and the friction at the point of suspension, will vibrate for many hours.

The time occupied in an oscillation, when it is not very considerable, is the same, whatever may be its length; or in other words, the vibrations are isochronous. This property is said to have been discovered by Galileo, the celebrated philosopher, who improved the telescope, and discovered the satellites of Jupiter. He was sitting one evening at the church of Pisa, and after the great chandelier was lighted up, it was left swinging, which attracted the attention of the youthful philosopher; and he, at the same time, observed that its vibrations were isochronous, that is, they were performed in equal times. By a subsequent examination, he established the truth of his observation, and introduced the pendulum for the measurement of time. The reader may easily prove the truth of this law, if he pleases, by counting the oscillations, and he will find that whether the pendulum is vibrating in an arc of four or five degrees, or in one of a tenth of a degree, an equal time is required to perform the vibration.

Another important principle in relation to the pendulum, is, that the time occupied in an oscillation is not dependent on the weight of the ball, the substance of which it is made, or its shape, except so far as regards the resistance of the air. This law is easily demonstrated, for if we take balls of different substances and sizes, being careful that the pendulums be of equal length, and cause them to vibrate together, it will be seen that the time occupied in a vibration will be the same. Gravity in its action upon a pendulum, causing it to oscillate, exerts its influence upon each atom of the matter which composes the ball, and therefore a single atom suspended to the end of a thread, would oscillate with the same velocity as any number of atoms combined together in a body. So, also, an atom of iron would vibrate with the same velocity as an atom of platinum, or of gold, since all masses, whatever their nature, oscillate, in the same arc, with the same velocity. These observations will tend to illustrate the principle, that gravity acts in the same manner upon all bodies.

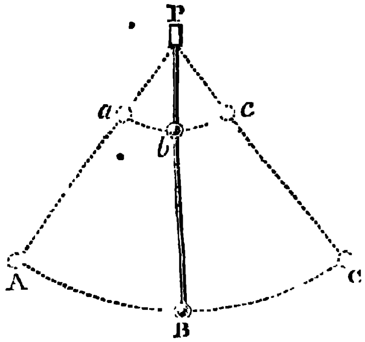
It may also be mentioned, as a third important law, that the time of the oscillations is as the square roots of the length of the pendulums: that is to say, if we take three pendulums, whose lengths are as one, four, and nine feet respectively, the time required for the oscillation of the second will be twice as long as that of the first, and the time of the oscillations of the third will be three times that of the first, because 1, 2, 3, are the square roots of 1, 4, 9, respectively.

As the oscillations of the pendulum vary with its length, a certain length is required that it may beat seconds, or, in other words, vibrate sixty times in a minute. The length required in the latitude of London, is a little more than thirty-nine inches, but a pendulum that would beat seconds in London, would not do so in Paris. The observations made upon the pendulum in the island of Cayenne, by M. Ritcher, first induced philosophers to doubt whether the earth was perfectly spherical, and it has since been used to determine this important problem. M. Ritcher found that the pendulum of his clock moved at a rate of 2° 28″ a day less than it ought, as regulated by the mean motion of the sun, and, to compensate for this error, he was compelled to shorten his pendulum nearly one-eleventh of an inch, in order that it should make vibrations equal to those it made in Paris. This phenomenon is easily accounted for: gravity is always according to the masses, and, therefore, a double mass will have a double attraction, and a treble mass, a threefold attraction. Now it is found that a certain pendulum will beat seconds at the poles of the earth, but to make the same pendulum beat seconds at the equator, its length must be altered, which is a proof that the attraction of the earth, that is, the gravity, is not the same in both places. A pendulum which vibrates sixty times in one minute, at the north pole, will not vibrate so many times at the equator.

All the laws of which we have been speaking, are quite independent of the intensity of gravity, for if this force should become a hundred times greater, or a hundred times less than it is, the vibrations would still be isochronous, and their time would still have the same relation to the weight and the length of the pendulum. If gravity were doubled in intensity, the velocity of all falling bodies would be increased, and pendulums would make their vibrations quicker, but the time of the oscillations would still be as the square roots of the length of the pendulums. If gravity were to cease altogether, bodies would cease to fall, and pendulums would cease to oscillate, except by their acquired velocities, which would cause them to continue in motion until the motion were destroyed by friction, but there would be no reason why the pendulum should come to rest in a direction perpendicular to the surface of the earth.

All the observations which have been made concerning the laws by which the vibrations of a pendulum are regulated, have reference to a simple pendulum, which is an inflexible thread without weight, having a single atom of matter attached. It must be evident that all the pendulums we are accustomed to use are compound, since it is impossible to fulfil the conditions of the definition, and it is therefore necessary to consider how far this circumstance would influence the application of the laws we have mentioned as applied to practice.

Let us take the simplest case of a compound pendulum that can be imagined, and suppose that we could obtain one that consisted of an inflexible thread, without weight, but having two heavy molecules attached to it at different distances from the point of suspension, as shown in the annexed figure. The molecule *b*, being at a less distance from the point of suspension than the molecule B, has a tendency to vibrate with a greater velocity; but as they are joined together and must oscillate in the same time, the one is retarded and the other is accelerated, an intermediate velocity being established, and that is the velocity of the compound pendulum. But there is always a certain point in the pendulum which is neither retarded nor accelerated, and performs its oscillations as though it were alone freely suspended from the thread, and that point is called the centre of oscillation, and its distance from the point of suspension is called the length of the pendulum, which is, in fact, equal to the length of a simple pendulum, that would oscillate with the same velocity.



The remarks which have been made in reference to the simplest of compound pendulums, are true in reference to all others; and as we can only employ these, there are considerable difficulties in the way of an effort to determine the intensity of gravity by their means. It is not easy to observe with accuracy the duration of an oscillation, or to determine with exactness the length of the pendulum, but both these difficulties have been overcome, and the problem has been frequently solved, first by Borda, in 1790, at the observatory of Paris, and since that period, by many English and continental philosophers, in various parts of the globe.

## THE WILD BOAR.

AMONG the many animals alluded to in the holy scriptures, one of them is that emblem of savage voracity and destruction, the wild hog: "The boar out of the wood doth waste it, and the wild beast of the field doth devour it," Ps. lxxx. 13. This animal, whether in a wild or domesticated condition, was accounted unclean, according to the mosaic dispensation; and not only so, it was held in special abhorrence, being regarded with a degree of aversion which was by no means entertained towards many animals equally unlawful to be used as food. Hence the hog is never mentioned but with disgust, or with a view to aggravate a scene of misery and degradation. In the beautiful parable of the prodigal son, who from affluence becomes overwhelmed with ruin, we find the depth of his wretchedness and destitution thus described: "He went and joined himself to a citizen of that country; and he sent him into his fields to feed swine: and he would fain have filled his belly with the husks that the swine did eat: and no man gave unto him." A picture this to a Jew of the most abject misery and degradation! We have, however, no reason for believing that any of the adjacent nations entertained the same abhorrence of this animal as did the jews; indeed, we know that it was domesticated in many, its flesh being esteemed excellent. Among the epicurean Romans, young pig was as favourite a dish as among ourselves at the present era. When the mohammedan religion spread in the East, many of its rites and observances being derived from those enjoined on the mosaic dispensation, the aversion to this animal spread with it, and in consequence it is deemed by the mohammedans of each sect, and in every country, as unclean. In the western portion of the old world, the hog, from the earliest ages, has constituted no inconsiderable part of the wealth of the ruder nations. Among our Saxon forefathers it was an important animal, inasmuch as it was the staple flesh meat consumed in every household. England, at the time of their dominion, was largely covered with forests, and in these vast droves of hogs, the property of a thegn, or ceorl, (or as we should now say, lord of the manor, or large landed proprietor,) were driven to feed upon the acorns and mast, under the care of trusty thralls, or bondslaves, who were answerable for their safety. Nor was their task easy; the same woods were frequented by wolves, whose ravages, both of the sheep and swine, were very extensive. In a Saxon calendar, which illustrates the agricultural labours of our forefathers, the following statement of a shepherd's duty occurs:—"In the first part of the morning I drive my sheep to their pasture, and stand over them in heat and in cold, with dogs, lest the wolves destroy them." (See Turner's Hist. Ang. Sax. vol. 2, App. iv.) The same care was used by the swineherd. In an ancient Saxon grant, (see as above,) the deed thus runs: "I give food for seventy swine in that woody allotment, which the countrymen call Wulferden leh," &c. With reference to the field sports of the same people, we read, "In September is boar-hunting, in October is hawking." The wild hog then existed in our island as it does at the present time in the larger forests of continental Europe and Asia. In its unreclaimed condition, the hog is an active, powerful, and formidable animal; his motions are prompt and rapid, and his attack impetuous. Armed with enormous tusks, he strikes right and left, lacerating the body of his antagonist, and producing the severest wounds. Hunting the wild boar was one of the favourite pursuits of our forefathers, and is still kept up in Germany, where a breed of large hounds is used for driving up the game. In India, it is also among the field sports: but by no means one of the least dangerous, either to the men or dogs, as it often happens that an animal infuriated by slight wounds, and closely pressed, will turn suddenly upon its pursuers, and in a moment occasion the loss of life among the party. The ancient Greeks and Romans were no less addicted to the chase of the wild boar than our rude ancestors; it abounded in the woods and marshes of Italy and Greece, and is still common in the Levant. The following picture from the Iliad of Homer is so graphic, that we conclude with it our present details:—

"So the wild boars spring furious from their den,
Roused by the cry of dogs and voice of men;
O'er their bent backs their bristly horrors rise,
Fires stream in lightning from their sanguine eyes;
On every side the crackling trees they tear,
And root the shrubs, and lay the forest bare;
They gnash their tusks, with fire their eye-balls roll,
Till some wide wound lets out their mighty soul."

M.

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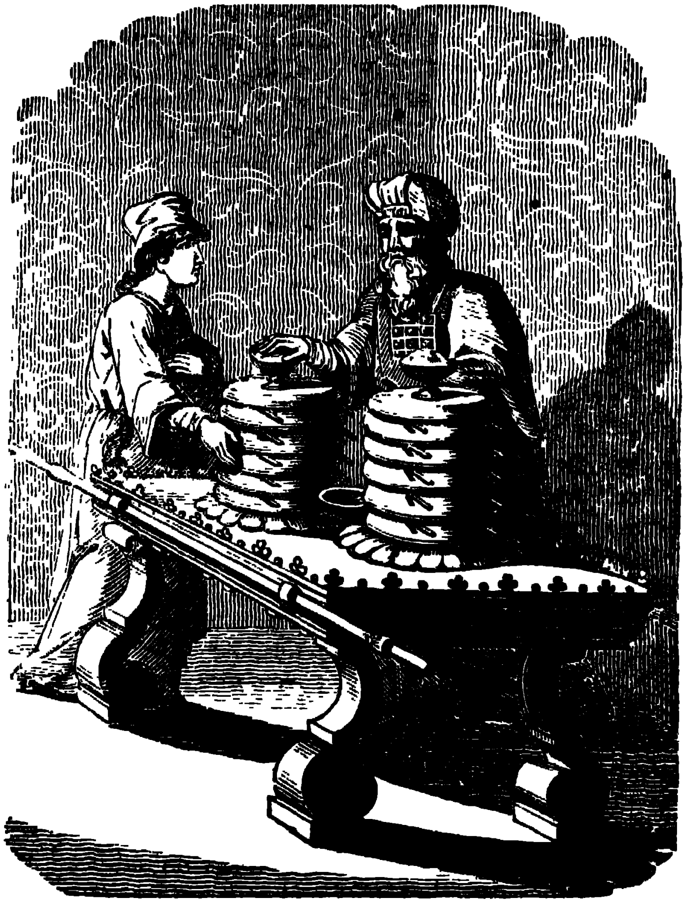


THE TABLE OF SHEW-BREAD.

## SCRIPTURE ILLUSTRATIONS.—No. XIV.

### THE TABLE OF SHEW-BREAD.

In the holy place, or sanctuary, of the jewish temple, stood the table of shew-bread. The word rendered shew-bread, means literally, "bread of faces," or of presence, from its being placed in the presence of the Lord.

The table was small, and made of shittim wood, covered with plates of gold, having a little border round it, adorned with sculpture. It was two cubits long, one cubit wide, and one and a half in height. Upon this table, every sabbath-day, were placed twelve loaves, with salt and incense. All are not agreed as to the manner in which the loaves of shew-bread were ranged; indeed, the form of the above table, and the arrangement of the loaves upon it, with the golden cup which contained the salt between them, only depends upon the authority of learned men, who have endeavoured to construct their representations from the descriptions in the Bible. The loaves were placed hot on the sabbath-day before the Lord, when they also took away those which had been exposed a whole week, and which could not be lawfully eaten but by the priests. This offering was accompanied with frankincense and salt; the frankincense was burnt on the golden table when they removed the old loaves.

This table, with the articles upon it, and its use, seems to typify the communion which the Lord holds with his redeemed people in his ordinances; the provisions of his house, the feasts which they sometimes are favoured with. Also, the food for their souls, which they always find when they hunger after it, and the delight he takes in their persons and services, as presented before him in Christ Jesus.

## CHRISTIANITY AND HEATHENISM CONTRASTED.

It was a rule of one of the wisest among the gentiles, that we are born, not only for ourselves, but that our birth is partly for our country, partly for our parents, and partly for our friends. A goodly and golden sentence, much admired, and greatly commended, and often alleged. But if it be compared with the doctrine of Christ, and the duty of all christians, it will be found maimed in its limbs, and defective in its parts, neither having a good beginning, nor making a perfect ending. For, first of all, he prescribeth that our charity should be employed towards ourselves, which they have well marked, allowed, and followed, who say, that a well-ordered charity beginneth at himself. But this is far from the doctrine of Christ and his apostles. Christ himself commandeth us to love our neighbour as ourselves, and Paul teacheth that charity seeketh not her own things.

Again, he maketh mention of our country, of our parents, and of our friends, and rangeth them into good order, but what becometh of the poor? Where, or in what place of this notable sentence doth he place them? he speaketh not of them at all: let them shift as they can, they are quite forgotten, the philosopher's charity stretcheth not to them; let them sink or swim, live or die, feed or starve, it was all one to him, and to that religion which he believed. Indeed, a poor person, when in extreme distress in the time of heathenism, had no other means to live and sustain himself and his family, than to sell himself as a slave to him that would buy him; either he killed himself, or else he perished for hunger, and died through want and famine. True it is, when they saw some men with their eyes languishing in misery, and heard them with their ears, pitifully complaining in their extremity, they were sometimes touched with commiseration and compassion towards poor persons, but they never called or accounted this duty of humanity a virtue, but only a humane passion or natural affection.

Furthermore, they never builded or erected any hospitals, or houses of refreshing to lodge and nourish the poor, neither had the princes the almoners, to distribute their alms, as christians have. When a child was born mis-shapen and evil formed among them, it was killed; yea, it was not only allowed, but commanded, to stifle and strangle it, that it should not be brought up: a cruelty and inhumanity against nature, and a despite and injury done to the Creator.

They made account of poor men as they did of beasts; for, alas, as these poor wretches came into the market-place, and set themselves to sale, as men do their cattle, to such as bought them, standing there at offer and proffer, had full possession to do with them what they would; they had power to kill their bondmen at their pleasure, when, and how, and for what cause they thought good, and were not subject to give any account of their death, and for their so doing. They ordinarily killed their slaves and servants, when they became unprofitable unto them, and reserved such as were strong to labour, and able to do them service.

Moreover, they set up sundry theatres for combats, to offer pleasure, and make pastime to the beholders, and caused their poor slaves to band themselves in two parts, one against another; then they brought them forth, causing them furiously to set one upon another with naked swords, and with naked bodies, none of them being furnished with any defensive armour; and the people assembled to see this most ungodly sport, laughed at it, and took no less pleasure to look upon it, than some men now take pleasure to see game cocks fight one with another.

Attersoll.

## FAITH AND LOVE.

That love is not sincere which proceedeth not from, which is not a fruit of faith: those who do not first really believe on Christ, can never sincerely love Him; it is faith alone that worketh by love towards Christ and all his saints. If, therefore, any do not believe with that faith which unites them to Christ, which within purifies the heart, and is outwardly effectual in duties of obedience, whatever they may persuade themselves concerning love unto Christ, it is but a vain delusion. Where the faith of men is dead, their love will not be living and sincere; John xiv. 15; 1 Pet. i. 8.—*Dr. Owen.*

## BOTANY.—No. IV.

### CAPRIFOLIACEÆ.

The plants collected under this general term, are within the reach of all readers, and may be gathered in summer to exercise the curious in the use of botanical language. The honey-suckle, elder, snowberry, and guelder-tree, are always at hand, and recommend themselves by their beauty, scent, or usefulness. The honeysuckle perfumes the neat dwelling of the cottager; the guelder-tree adorns our shrubberries with its fair clustering flowers; the elder yields the careful housewife berries for making her winter store of wine; and the snowberry ornaments our gardens at the fall of the year with its snowy fruit. The botanical inquirer will not gather the honey-suckle merely to smell its fragrance, or taste the honey lodged in the flower, but also to investigate the structure of the blossom and fruit, and compare its lineaments with our general character. The instructed eye observes fresh beauties, and realizes new gratifications in the most familiar plants and shrubs. It is said, that the master has a hundred eyes, but the servant only a pair: with the same practical truth it may be said, that the botanist has a hundred eyes, the common observer only two. The aim of all botanical details is to cherish habits of attention; to methodise our notions; and to quicken the perception by directing the judgment.

*Calyx*, consisting of five, rarely four, segments, but united into a tube and growing to the germen; the limb or border divided into four or five lobes, and forming a crown upon the top of the fruit.

*Corolla*, inserted into, or, to speak more correctly, originating from the calyx, having its five petals adhering by their edges so as to form a tube; from this circumstance it is called a corolla gamopetala. The petals, however, are not united at the top, but assume the character of lobes or segments, which are alternate with the divisions of the calyx, or stand opposite to the points of division. These lobes are sometimes irregular, as in the honey-suckle. In æstivation, or budding, the segments of the corolla have their edges touching each other, but not overlapping; under such circumstances, the æstivation is said to be valvular, that is, resembling valvæ, or folding doors, the edges of which approach and touch, but do not lie one upon the other when shut.

*Stamens*, proceeding from the calyx, but adhering to the corolla. Five in number, to correspond with the lobes of the calyx, and severally opposite thereto. Sometimes they peer above the segments of the corolla; at others, are hidden within its tube. The filaments are awl-shaped, that is bent, and tapering to a point towards the anther. Anthers, oval with two cells. Germen growing to the calyx, which forms as it were a cup for its reception. In the early stages of the germen, if an horizontal cut be made across it, three cells present themselves, but in process of growth, one or two of them become obliterated by the intrusion of the fertile cell.

*Styles* united into one. If we assume, with Mr. R. Brown, that each cell of the germen is in all cases furnished with its appropriate style or tube for conveying the pollen to the seed, as in this instance we find three cells in a nascent germen, so we ought to find three styles. Now, petals unite and form a tube, and in the same way do styles unite and form one style. Hence, we may say that there are three styles, but united into one. In confirmation of this, we might observe, that each stigma is the termination of a style; and since, therefore, we meet with three stigmata, we infer that there are virtually three styles. Berry covered with the border of the calyx, frequently pulpy, as in the honey-suckle and snowberry, rarely dry, and juiceless. Seeds one or more in each cell. Spermodermium or outer covering of the seed crustaceous, albumen fleshy.

*Leaves* without stipulæ, or minute leafy appendages at the base of the foot-stalk; in some instances, however, a pair of small ones is met with, as in the dwarf elder.

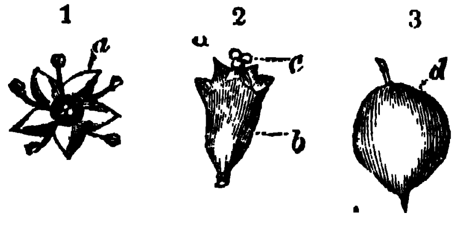
### EXAMPLES.

*Sambucus.*—Calyx border small, divided into five segments. Corolla wheel-shaped, that is, having its five segments flat, and spread out like the spokes of a wheel. Segment or lobes blunt. Stamens five. Styles very short, so that the three stigmata alone are discernible. Berry nearly round in maturity, with only one cell, the partitions which separated them having disappeared. Seeds three, attached by a thread to the axle or central column of the berry; this column is formed by the meeting together of the partitions. *Sambucus ebulus*, dwarf elder, walwort or danewort. Cymes or clusters of flowers, three parted. Stipulæ or leafy appendages present. Stem herbaceous, about three feet high. Flowers of a dull flesh colour. The reddish appearance of this herb gave rise to the fable, that it sprang from the blood of the Danes, whence it got the name of danewort, that is, dane-herb. Found by road-sides, borders of fields, and in burying-grounds.

*S. nigra, Common Elder.*—Cymes, five parted. Leaves ovate or egg-shaped; serrate or toothed, like a saw, at their edges. Stem arboreous, very much branched. As the elder is familiar to all, the reader may easily find an opportunity of gaining an idea of what Linnæus and his followers call a cyme. "A cyme," says the late Sir James E. Smith, who was a pupil of that distinguished naturalist, "consists of several stalks, springing from one common centre, like an umbel, but subdivided in an irregular, somewhat alternate mode, and forming a nearly level, or mostly convex surface of flowers." In the ebulus, the principal rays diverging from the first point of separation are three; in the nigra five, constituting a specific difference easy of enunciation, independent of other distinctions which may be gathered from the stem and foliage.

*Viburnum.*—Calyx with five teeth, persistent or continuing with the fruit after the other parts of the flower have fallen. Corolla bell-shaped, or campanulate, as the term is; divided into five segments. Styles of no perceptible division, the three stigmata, therefore, appear to be seated upon the top of the germen: in this condition they are said to be sessile. Berry crowned with the calyx, with only one seed, the other two disappearing. Seed compressed or flattened.

*V. Lantana*, pliant mealy-tree or wayfaring tree. Leaves heart-shaped, serrated or toothed like a saw, well marked with veins, tomentous or cottony underneath. Flowers in cymes, white. Berry black and mealy. In clayey soils. The twigs of the wayfaring-tree are limber, downy, with a hoary pubescence, and, unable to support their own weight in an upright position, present themselves in a bending direction. Bird-lime may be obtained from the bark which covers the root.



VIBURNUM OPULUS.
Fig. 1.—*a* Corolla.
Fig. 2.—*b* Calyx. *c* Threefold Stigma.
Fig. 3.—*d* Berry.

*V. Opulus.*—Guelder-tree. Leaves lobed, remarkable for having a large gland or protuberance on each side of the leaf-stalk. By observing the mode of flowering, or as it is technically called, the inflorescence of these shrubs, the student may improve his notion of a cyme, for in both instances it comes under that denomination.

*Lonicera.*—Calyx, a tube with five teeth. Corolla tubular, funnel or bell-shaped. The omb or border divided irregularly.

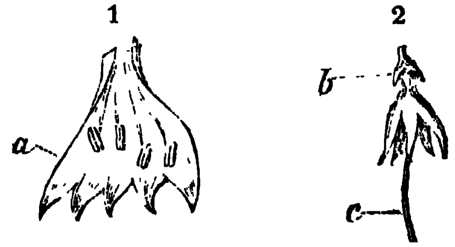
*L. Periclymenum*, — common honeysuckle.

*L. Caprifolium*, flowers in whorls, and terminal. Leaves deciduous, falling off betimes: the upper pairs grow together, so that the stem passes through them; from this circumstance it is said to be perfoliate.

*Symphoricarpos.* — Calyx, a globular tube, border with four or five teeth. Corolla with four or five lobes. Stamens, five appearing above the corolla. This genus was first established by Dillenius in his Hortus Elthamensis, p. 371, and so denominated from the clustering nature of its fruit, which is densely collected together.

*S. vulgaris.*—Common snowberry. This shrub is familiar to the eye of every one who has looked into our gardens, and easily distinguished by the snowy whiteness of its clustering berries.

*Linnæa.*—Stamens didynamous, or two longer than the other two. Berry dry, with three cells, severally with three seeds in each. Styles collected into one, which is terminated by a globular stigma.



LINNÆA BOREALIS.
Fig. 1.—*a* Corolla and Stamens.
Fig. 2.—*b* Second Calyx. *c* Style.

*Linnæa borealis.*—This little plant is a native of the northern regions. It was first found in Sweden, and named after that illustrious naturalist, Linnæus; it has since been found in England, and was collected by the writer about the shores of Kotzebue Sound. Its root is perennial, and produces somewhat woody stems, thin and creeping, about a foot in length, furnished with evergreen leaves, of a roundish, oval form, placed opposite to each other in pairs. Its flowers are white, or slightly empurpled, of a sweet smell, and nodding. The involucre met with in the other members of this order, appears in the form of a secondary calyx. This is owing to the simple circumstance of the umbel having but one flower instead of several. L.

## ON THE HEART AND CIRCULATION OF THE BLOOD.—NO. III.

The heart, as we have seen, is the centre of the circulation, the fount whence the vital fluid is distributed, and to which it is returned. We have observed, that it consists of two auricles and two ventricles, and that their contractions and dilatations are the *modus operandi*, by which the blood is admitted and propelled.

In following the course of the blood, we have alluded to the contraction of each separately; but our readers must not suppose that such is the case in reality, for the auricles contract and dilate together, and the ventricles do the same; and while the auricles are dilating to receive the blood flowing in from the veins, the ventricles contract to expel the blood which they have just received from the auricles; and *vice versa*, while the auricles contract, the ventricles dilate: as, however, it is the action of the ventricles which is alone perceptible, it is to that, when speaking in general terms of the pulsation of the heart, that the allusion refers. The dilatation is termed *diastole;* the contraction *systole*.

"How keenly sensitive must be the heart," is a common opinion, and is naturally the impression its actions and energies are calculated to make. We see it for three score years and ten, labouring at its task; unwearied, unsubdued, till death paralyzes its efforts; and even then, it yields the last to the power of the destroyer.

The general muscles of the body are soon fatigued, and require repose and rest; not so the heart: while we sleep, or while we are awake, its energies are still in operation. But we must not thence conclude, that it is endowed with exquisite sensibility; nor yet, because, as we all know it to be influenced by the passions and affections of the mind, are we to imagine that it is feelingly sensitive itself. It is, in truth, gifted with that peculiar modification of sensation, by which it is qualified for its work.

Sir Charles Bell, speaking on this subject, instances the following case, related by the celebrated Harvey:—

A noble youth of the first family of Montgomery, from a fall, and consequent abscess on the side of the chest, had the interior marvellously exposed, so that after his cure on his return from his travels, the heart and lungs were still visible, and could be handled; which when it was communicated to Charles I., he expressed a desire that Harvey should be permitted to see the youth, and examine his heart. "When," says Harvey, "I had paid my respects to this young nobleman, and conveyed to him the king's request, he made no concealment, but exposed the left side of his breast, when I saw a cavity, into which I could introduce my fingers and thumbs. Astonished with the novelty, again and again I explored the wound, and first marvelling at the extraordinary nature of the cure, I set about the examination of the heart. Taking it in one hand, and placing the finger of the other on the pulse of the wrist, I satisfied myself that it was indeed the heart which I grasped. I then brought him to the king, that he might behold and touch so extraordinary a thing, and that he might perceive, as I did, that unless when we touched the outer skin, or when he saw our fingers in the cavity, this young nobleman knew not that we touched his heart."

Other observations confirm this great authority; and the heart is declared insensible. And yet the opinions of mankind must not be lightly condemned. Not only does every emotion of the mind affect the heart, but every change in the condition of the body is attended with a corresponding change in the heart: motion during health, the influence of disease, every passing thought will influence it. Here is the distinction manifested. The sensibility of the surface of the eye is for a purpose, and so is the sensibility of the heart. While that of the eye guards it against injury from without, the heart, insensible to touch, is yet alive to every variation in the circulation, subject to change from every alteration of posture, or of exertion, and is in sympathy of the strictest kind with the constitutional powers. Thus would it appear that "the sensibilities of the living frame are appropriate endowments, not qualities necessarily arising from life, still less the consequences of delicacy of texture."

We shall next consider more particularly the arteries and veins. M.

## INSECTS. No. XXXV.

### (*Character and Age.*)

It is usual for us to regard the human species as having what is called a particular character, yet it is as certainly possessed by inferior creatures. They have their respective peculiarities, and the permanent differences between the cat and the dog, the sheep and the wolf, the cameleopard and the tiger, or others equally obvious, need not be described. It might, therefore, be inferred from analogy, that, similar varieties appeared among insects, and that they do, is fully demonstrated by observation. This will yet be illustrated by many examples, though here it must suffice to remark, that between the males and females of the same species, a great dissimilarity is apparent. In general the males are more fitted for locomotion, and more locomotive; and the females, on the contrary, are necessarily more stationary. And this for an obvious reason: the law is, that the male shall seek the female, and therefore he is peculiarly gifted for this purpose. Hence, while his partner in many cases has very simple antennæ, he has very complex ones; and while she has either no wings, or only rudiments of them, he is amply provided with them.

Amongst the insects that suck the blood of man or beast, such as gnats or horse-flies, it is the female alone that is blood-thirsty, the males contenting themselves with the nectar of flowers. But the difference of characters in the sexes has been more noticed in those that live in societies, and is quite the reverse of what takes place in the human species. While the females and workers are laborious and active, diligent and skilful, wise and prudent, courageous and warlike; the males, on the contrary, have no such qualities. Though till a certain period they are supported at the expense of the community, they take no part in its labours, either in collecting and forming the public stores, or in feeding and attending the young. They are idle, cowardly, and inactive; have neither art nor skill of any kind, and are unprovided with the usual offensive weapons of their species. These observations, in their full force, apply particularly to the hive-bee, and partially to the other social insects; though there are, it must be admitted, some exceptions to this slothful character in the males. Reaumur states that the male humble-bees are not an idle race, but work in concert with the rest to repair any damage or derangement that may befall the common habitation; and the male wasps are, in a certain way, very industrious. They do not, indeed, assist in building the nest, and in the care of the young brood; but they are the scavengers of the community; for they sweep the passages and streets, and carry off all the filth. They also remove the bodies of the dead, which are sometimes heavy burdens for them; in which case two unite their strength to accomplish the work; or, if a partner be not at hand, the wasp thus employed cuts off the head of the dead insect, and so effects its purpose. These creatures, in consequence, unlike the male bees, share the general lot of the community, and while the latter are at a certain period destroyed, the former are suffered to survive till the cold cuts off them and the workers together.

As to age, there is less diversity in the duration of the lives of insects in their perfect, than in their larva or pupa state. Some live only a few hours, like several species of ephemeræ. These emerge by myriads of millions at a certain season of the year, from some of the rivers in France; and of these a few particulars cannot fail to be interesting. These insects, in their first and intermediate state, are aquatic: they either live in holes on the banks of rivers or brooks, below the water, so that it enters into their habitations, which they seldom quit; or they swim about and walk on the bed of the stream, or conceal themselves under stones, or on pieces of stick. Though their life, when they assume the perfect state, is usually extremely short, some being disclosed after sun-set, laying their eggs and dying before sun-rise; and many not living more than three hours; yet in their preparatory state their existence is much longer; in some one, in others two, in others even three years.

The different species assume the imago, or reach the perfect state, at different times of the year; but the same species appears regularly at nearly the same period annually, and, for a certain number of days, fill the air in the neighbourhood of the rivers, emerging also from the waters at a certain hour of the day. Swammerdam observed some which began to fly about at six o'clock in the evening, or about two hours before sun-set; but the great body of those noticed by Reaumur, did not appear till after that time; so that the season of different harvests is not better known to the farmer than the time in which the ephemeræ of a particular river are to emerge, is to the fisherman. Yet a greater degree of heat or cold, the rise or fall of the water, and other circumstances we are not aware of, may accelerate or retard their appearance. Between the 10th and 15th of August is the time when those of the Seine and Marne, which Reaumur described, are expected by the fishermen, who call them manna: and when their season is come, they say, "the manna began to appear, the manna fell abundantly, such a night;"—alluding, either to the astonishing quantity of food which the ephemeræ afford the fish, or to the arge quantity of fish which they then take.

Reaumur first observed these insects in he year 1738, when they did not begin to show themselves in numbers till the 18th of August. On the 19th, having received notice from his fishermen that the flies had appeared, he got into his boat about three hours before sun-set, and detached from he banks of the river several masses of earth filled with pupæ, which he put into a large tub full of water. This tub, after staying in the boat till about eight o'clock, without seeing any remarkable number of he flies, and being threatened with a storm, he caused to be landed and placed in his garden, at the foot of which ran the Marne. Before the people had landed it, an astonishing flight of ephemeræ took place from t. Every piece of earth that was above he surface of the water was covered by them, some beginning to quit their slough, others prepared to fly, and others already on the wing; and even when under the water, they were to be seen in a greater or less degree of forwardness. The storm coming on, he was obliged to quit the amusing scene; but when the rain ceased to fall, he returned o it. As soon as the cloth with which he had ordered the tub to be covered, was removed, the number of flies appeared to be greatly augmented, and kept continually ncreasing: many flew away, but more were drowned. Those already transformed, and continually transforming, would have been ufficient of themselves to have made the ub seem full; but their number was soon very much enlarged by others attracted by he light. To prevent their being drowned, he caused the tub to be again covered with he cloth, and over it he held the light, which was soon concealed by a layer of hese flies, that might have been taken by handfuls from the candlestick.

But the scene round the tub was nothing o be compared with the wonderful spectacle exhibited on the banks of the river. The exclamations of his gardener drew the llustrious naturalist thither: and such a ight he had never witnessed, and could carcely find words to describe. "The myriads of ephemeræ," says he, "which illed the air over the current of the river, nd over the bank on which I stood, are neither to be expressed nor conceived. When the snow falls with the largest flakes, nd with the least interval between them, he air is not so full of them as that which urrounded us was of ephemeræ. Scarcely had I remained in one place a few minutes, when the step on which I stood was quite concealed with a layer of them, from two to four inches in depth. Near the lowest step, a surface of water, of five or six feet dimensions every way, was entirely and thickly covered by them, and what the current carried off was continually replaced. Many times I was obliged to abandon my station, not being able to bear the shower of ephemeræ, which falling with an obliquity less constant than that of an ordinary shower, struck continually, and in a manner extremely uncomfortable; every part of my face, eyes, mouth, and nostrils, were filled with them."

Before ten o'clock, this interesting spectacle had vanished. It was renewed for some nights afterwards, but the flies were never in such prodigious numbers. The fishermen allow only three successive days for the great fall of the manna; but a few flies appear both before and after, their number increasing in one case, in the other diminishing. Whatever be the temperature of the atmosphere, whether it be cold or hot, these flies invariably appear at the same hour in the evening, that is, between a quarter and half-past eight; towards nine they begin to fill the air; in the following half-hour they are in the greatest numbers, and at ten there are scarcely any to be seen. So that in less than two hours, this infinite host of flies emerge from their parent stream, fill the air, perform their appointed work, and vanish. A very large proportion of them falls into the river, when the fish have their grand festival, and the fishermen a good harvest.

(To be continued.)

## HUMANITY.

Humanity is a healthy susceptibility of mind, that prevents us from inflicting unnecessary pain, not a morbid squeamishness of disposition which sighs with affected sympathy over cases of imaginary or doubtful suffering. In the constitution of this beautiful world, peopled as it is with human beings, animals, birds, fishes, reptiles, and insects, there is much that we cannot comprehend. That the existence of one part of the creation should be preserved by the destruction of the other, is one of the many mysteries which He only, whose "ways are not as our ways," can fully explain. We have all, however, our several duties to perform, and if, in discharging them, we, of necessity, trespass on the happiness of inferior beings, we cannot on that account be justly accused of inhumanity. To set our foot on a worm needlessly; to crush a spider that in no way incommoded us, would be cruelty; but to remain within doors, in a state of idleness, lest we should tread on the countless creatures, too small to be perceived, that throng our pathway, would justly entitle us to the charge of affectation and folly. It is necessary that we should eat and drink, but, in satisfying our appetite, what numberless creatures we destroy. To lay down a rule which would enable us to know precisely how far, in every case, to carry our benevolence, would perhaps be impossible; but if, with a high and holy reverence to our heavenly Father for our own personal blessings, we habitually regarded all creatures as His creatures, there would be little danger of our erring widely in the exercise of inhumanity, while a sincere desire to obey Him, in all things, would prevent our permitting an over-scrupulous refinement to interfere with the discharge of our several duties. The following tale is well calculated to reprove unreasonable fastidiousness:—

A venerable bramin, who had never in his days eaten any thing but rice and milk, and held it the greatest of crimes to shed the blood of any thing that had life, was one day meditating on the banks of the Ganges. He saw a little bird on the ground picking up ants as fast as he could swallow. "Murderous wretch!" cried he, "what scores of lives are sacrificed to one gluttonous meal of thine!" Presently a sparrow-hawk, pouncing down, seized him in his claws, and flew off with him. The bramin, at first, was inclined to triumph over the little bird; but, on hearing his cries, he could not help pitying him. "Poor thing!" said he, "thou art fallen into the clutches of thy tyrant!" A stronger tyrant, however, took up the matter; for a falcon, in mid-air, darting on the sparrow-hawk, struck him to the ground, with the bird lifeless in his talons. "Tyrant against tyrant," thought the bramin, "is well enough." The falcon had not finished tearing his prey, when a lynx, stealing from behind the rock on which he was perched, sprung on him, and, having strangled him, bore him to the edge of a neighbouring thicket, and began to suck his blood. The bramin was attentively viewing this new display of retributive justice, when a sudden roar shook the air, and a huge tiger, rushing from the thicket, came like thunder on the lynx. The bramin was near enough to hear the crashing bones, and was making off in great terror, when he met an English soldier, armed with his musket. He pointed eagerly to the place where the tiger was making his bloody repast. The soldier levelled his gun, and laid the tiger dead. "Brave fellow!" exclaimed the bramin. "I am very hungry," said the soldier, "can you give me a beef-steak? I see you have plenty of cows here." "Horrible!" cried the bramin; "what! I kill the sacred cows of Brahma!" "Then kill the next tiger yourself," said the soldier.

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### THE FAITH OF ABRAHAM.

Many and great were the trials with which Abraham was visited, and many circumstances would have led him, had he not been possessed of a lively faith in God, to have despaired of the fulfilment of the Divine promises respecting him. It was promised that his seed should be as the stars of heaven for multitude, and yet he was at an hundred years old without any children; but against all human hope and probability, he believed with a joyful hope on the security of the Divine word. And when, at the Divine command, he was some years afterwards called to offer up his son, yet his faith rose far above even parental affection, and he reasoned thus with himself, that God was able even to raise him from the dead, and restore him to life again. Thus, he "staggered not at the promise of God through unbelief, but was strong in faith, giving glory to God."

Let us also be strong in faith, remembering that thus it becomes us to give glory to God. He who has promised, is able to perform. He has already done that for us, which we had much less reason to expect, than we now have to hope for any thing that remains. He delivered his Son Jesus for our offences, to redeem us by his blood from final and everlasting ruin. C. J. M.

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Love to Christ.—He that loveth Jesus Christ most, is like unto God. Matt. iii. 17, 1 John v. 1.—*Dr. Owen.*

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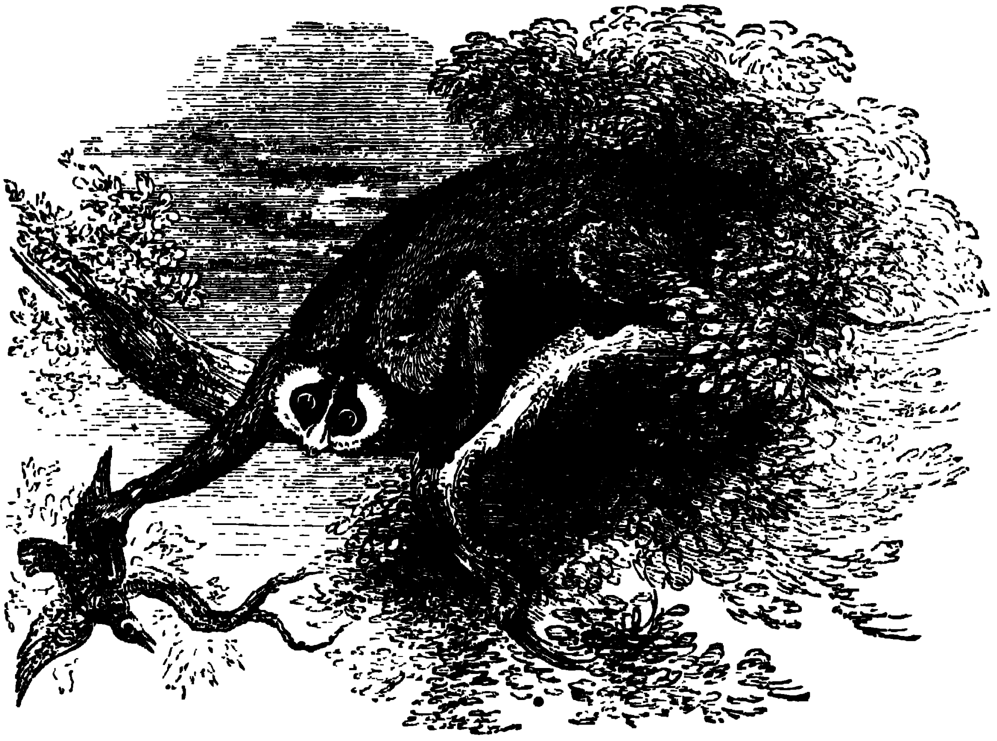

THE SLOW-PACED LORIS.

Among the singular animals of the order quadrumana of Cuvier, the loris (*loris tardigradus*) is one of the most interesting. The quadrumana, of which the monkeys are the prominent example, are all arboreal in their habits, and generally distinguished by their activity and rapid evolutions among the branches, bounding from one to another with inconceivable address and vigour. They are here, and gone, before the eye can mark them. To this description, however, the loris is a striking exception, its motions being slow, and languid in the extreme. The loris is a small animal, of the size of a half-grown cat, covered with delicately fine and thick fur, of a reddish brown colour, a dark mark encircling the eyes, and extending down the back, while a white line passes down the forehead. It inhabits the forests of Ceylon, Java, Hindostan, &c., where it sleeps among the umbrageous foliage of the branches during the day, but rouses up on the approach of darkness, and begins its ghostlike prowl in quest of food, which consists of fruits, large insects, and small birds. As in all nocturnal animals, its eyes are large and full, and from the dilatation of the pupil during twilight, glisten with a peculiar lustre. Not an insect, not a bird escapes the scrutiny of those glaring orbs. Slowly and imperceptibly as the minute-finger traverses the dial-plate, does the loris advance towards his prey; and not less surely is the fixed mark attained. What in the case of other animals is done by rapidity of motion, is in this attained by a contrary proceeding. No abrupt motion, no quick advance excites alarm, no noise of an approaching foe rouses the slumbering bird upon her perch; the victim is grasped before the danger is suspected.

In captivity, the loris[*] is timid and gentle; its usual position, during the day, while sleeping, is to hang suspended by its hands, the head being folded on the breast, and the body drawn together. On awaking in the evening, which it does gradually, its first care is to clean its fur, by licking it in the same manner as a cat. Its fur, indeed, which we have noticed as very fine, is intended, no doubt, to protect the animal from cold, to which the peculiar slowness of its motions may be supposed to render it, even in its native climate, very susceptible. In our latitudes, it suffers much from the reduced temperature and frequent changes, so that it is with difficulty kept long alive. Its sense of hearing is very acute.

In its general contour, the loris is moderately stout; but the limbs are slender, and, as in the monkey and lemur, furnished with hands for grasping. The head is round and broad, with short pointed muzzle; the ears are wide, but concealed in the fur. The hinder limbs are larger than those before; the tail is wanting.

Though several accounts have been published of the manners of these remarkable creatures, while in a state of captivity, little is known of the details of their instincts and habits in their native woods. Night, the period of their active existence, co-operates with their unobtrusive forms, and the seclusion of their haunts, to shroud them from the observations of man. M.

## OLD HUMPHREY ON AIDING THE MISSIONARY CAUSE.

As I hold the highest title on earth to be that of a servant of God, and the most important employment that of making known to sinners the salvation that God has wrought for them through his Son Jesus Christ, so I cannot but estimate very highly the character of an humble-minded, zealous, conscientious missionary. Men undertake, endure, and achieve much when riches and honours and reputation are to be attained, but where is the worldly reputation of him who goes, with his life in his hand, to make known to barbarous lands the glad tidings of salvation? Where are the honours and the money-bags of the missionary? In many cases toil and anxiety, hunger and thirst, reviling and violence, danger and death await him; but where is his earthly reward? I want you to ply yourselves with these questions, and then I will ask you if you have ever done any thing for the missionary cause?

Old Humphrey is no party man; he pleads not in particular for this or that missionary institution. Support them all if you like, if God has blessed you with the ability; but at least neglect not to do something for one of them, lest you should be held guilty of overlooking the ignorance and darkness of those who live without God in the world, knowing nothing of the grace of the Redeemer.

Are you rich? If so, have a care; for where much is given, much will be required. Riches have not only their power, but their responsibility also. Have you never read how hard it is for a rich man to enter the kingdom of heaven? Have you never heard the injunction, "Make to yourselves friends of the mammon of unrighteousness, that ye may be received into everlasting habitations?" Come, come! let Old Humphrey do you a kindness, by persuading you to be liberal to the missionary cause. Never is a man more successfully employed in promoting the welfare of his own soul, than when engaged in doing good to the souls of others.

Are you poor? Never mind that, you must be poor indeed if you have not a prayer in your heart for the heathen; and if you have a prayer for them in your heart, you will soon have a penny for them in your hand. I have just been reading of an old woman who was so very poor that she could not spare even a penny to assist the missionaries, though her heart was in the cause; but mind ye, "where there is a will, there is a way." She was a spinner of yarn, and, knowing no better plan, she determined to spin an extra hank of yarn every week, and thus contribute her penny to the good cause. Come, come! let us imitate the old woman in her labour of love; let us spin another hank of yarn, and give another penny to the missionary cause.

There are hundreds among us, who, when invited to make themselves useful, when required to put their shoulder to the wheel, their hand to the plough, or their fingers into their purses, begin "with one consent to make excuse." They really have so many things to attend to, and already give so much away, that it is not in their power to do or bestow more for the glory of God, and the welfare of their fellow-men. Now if it be really the case with you, that you go to the extent of your means, Old Humphrey has not another word to say about the matter; but if you talk thus merely to excuse yourselves, if you cavil at the cause you are urged to support, merely to prevent the parting with a small portion of your abundance, look to yourselves, for you stand in slippery places.

Over and over again have I observed, that they who are the first to tell the aged beggar to go to his parish, are the last to pay the parish rates; and that they who are forward to condemn the missionary cause abroad, saying "charity begins at home," are the most backward to assist in spreading the gospel, or in opening their purses for the benefit of the poor of their own neighbourhood. Depend upon it, you will never have your sick bed, nor your dying hour embittered by the thought that you have done your part to send the missionary, and the Bible, to the heathen world, though I am not quite so certain that the consciousness of having neglected to do so will not create a parting pang.

Many have I known who have done too much for their own selfish gratifications; but never have I met with one who had done too much for God's glory. Show me a man that loves his Bible, and I will show you one that would delight to spread bibles all over the world. Show me a man whose soul magnifies the Lord, and whose spirit rejoices in God his Saviour, and I will show you one whose heart will leap within him to lend a helping hand to the missionary, that he may go forth and proclaim glad tidings of great joy to all the people on the face of the earth. If, then, you have any pity for the sinner, and love for the Saviour, promote the missionary cause.

It is a glorious sight to see a merchantman under weigh, her sails filled with the breeze, and her colours flying in the winds of heaven! She goes not forth carrying thunder and lightning to blast the image of God in desolating war, but to bear abroad the blessings of peace. Her cargo is to benefit the bodies and souls of men; our merchandise and our missionaries may go together. Here may be seen on board the same ship, a wrapper of flannel and a bundle of religious tracts; there a bale of cloth, and yonder a box full of Bibles!

Old Humphrey cannot help urging you to join hand and heart in the missionary cause. Shall the negro lift up his emancipated hands in prayer, and the Hottentot and the Caffer unite in praise? Shall the Hindoo and the Ceylonese forsake their idolatry, and the inhabitants of the southern sea rejoice in the hope of eternal life, and you have no share in the work. Will not you bid them God speed by your benevolence, and tell them that you are men and brethren by your exertions in their favour? Yes, yes! you may never be moved by the feeble voice of Old Humphrey, but you will not, you must not, you cannot resist the appeal of millions of fellow-beings from across the heaving ocean, who are destitute of the means of grace, and the hope of glory.

## CHEMISTRY.—No. V.

### NITROGEN AND HYDROGEN.

Nitrogen is a substance very commonly found to be a component part of bodies, and as it has resisted every effort that has been made to decompose it, is considered an elementary principle. It is somewhat lighter than atmospheric air, of which it is the chief ingredient, and is distinguished by its negative qualities, which are in many respects directly opposed to those of oxygen. An atmosphere of pure oxygen would excite a violent action of all the animal functions, and nitrogen, or azote, as it has been sometimes called, is incapable of supporting life at all; but the union of the two is exactly adapted for the purpose; for the nitrogen acts as a neutralizer of the properties of oxygen, and renders it fit for respiration. Oxygen is a supporter of combustion, so energetic and rapid, that the eye can scarcely bear the intensity; but nitrogen is incapable of supporting combustion, and a lighted taper plunged into this gas is immediately extinguished; it therefore acts, in atmospheric air, by its negative properties, as a corrective of the energy of oxygen. Nitrogen exists in all animal substances, and is the principal agent in converting vegetable into animal matter.

To obtain nitrogen, mix iron filings with a little sulphur, and moisten them with water, which being done, place the compound in a glass bottle or other vessel, and cork it so as to prevent the access of atmospheric air. The oxygen of the enclosed air will be absorbed by the ingredients, in a few days, and nitrogen will be the residium. This gas may also be made by digesting animal flesh in diluted nitric acid.

Hydrogen resembles the two substances to which we have already referred, in being only found in a gaseous state. It is the lightest body in nature, and in the doctrine of definite proportions, it has been designated by some chemists as 1.

Hydrogen, or inflammable air, as it was formerly called, is one of the constituents of water, that compound being formed of one volume of oxygen to two of hydrogen; but in consequence of the extreme levity of the latter substance, it requires eight parts of oxygen, by weight, to one of hydrogen, to form this measure. It must not, however, be supposed that these two gases will combine and form water, when they are merely presented to each other, for they are then only mixed in the same way as oxygen and nitrogen in atmospheric air. But if an ignited taper be applied to the mixed gases, they will explode with great violence, and, entering into chemical combination, produce water. When oxygen and hydrogen, in the proportions to form water, are mixed together, and forced through a small jet, upon a burning substance, the most intense light and heat are produced. It is in this way that the light now used in some places for the exhibition of the microscope, is produced.

Hydrogen is one of the principles that enter into the composition of oils, fats, gums, and resins. It resembles nitrogen in its property of extinguishing combustion and destroying animal life, though it is itself capable of combustion. This gas, being so much lighter than atmospheric air, is used for the purpose of filling balloons. If a light bag of any substance impervious to gas, or in other words, air-tight, be filled with hydrogen, it will become lighter than the atmospheric air, bulk for bulk, and will consequently ascend, in obedience to the laws that govern floating bodies. A thin bladder or the craw of a turkey will make a very good hydrogen balloon.

The following method of making hydrogen gas may be easily practised by the chemical student. Take a small quantity of sulphuric acid, and add to it four times its weight of water, and place it in a large phial. "The temperature of the mixture will be so much raised by the union of the water with the acid, as to enable the iron to decompose a part of the water. If a hole be neatly made through a cork, which fits the mouth of the bottle, and a piece of tobacco-pipe, with a very small orifice, be fitted into it, and the whole cemented into the bottle with a mixture of resin and bees' wax, the hydrogen gas, as it is separated from the water, will pass in a continued stream through the pipe, and may be set on fire by the flame of a candle being brought into contact with it. The gas will continue to burn with a blue lambent flame, as long as the decomposition goes on." It is necessary to proceed with care in making this experiment, for if the atmospheric air enters the bottle, either through the cork or otherwise, an explosion will take place.

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## ON THE HEART, AND CIRCULATION OF THE BLOOD.—NO. IV.

The arteries of the system may be all regarded as ramifications of one great trunk, the aorta. An artery is easily known by the character of its structure, its *parietes* being firm and stout, and consisting of three layers; an inner, which is very smooth; a middle, which is by far the most considerable, and of a tough fibrous texture; and an outer, which is simply membranous.

After ramifying more minutely than we can well comprehend, so minutely indeed, as to spread like the finest network over every part of the body, they gradually terminate in veins; but so imperceptible is the transition, that it would be hard to say at what precise point the artery terminated, and the vein began.

Veins are not, however, the only terminations of arterial tubes: on the skin, and on various external membranes, multitudes open into what are termed exhalent vessels, which pour out a serous fluid; the mouths of these minute vessels, which are abundant on the skin, are termed the pores, whence the perspiration insensibly exudes, which is essential to the maintenance of health. It is also by these extreme ramifications, termed *capillaries*, that the various secretions are elaborated from the blood in a manner which leaves us entirely in the dark. Let a bone be fractured, it is by these minute tubes, that the osseous matter is furnished in order to effect a re-union; nay, the bone grows from youth to maturity by the supply deposited from these agents, which permeate the bones themselves, and are infinitely spread over the membrane (*periosteum*) which envelopes them. But why do we speak of the bones? not these only, but the flesh, the skin, every part of the body, the transparent humours of the eye, all are derived from the blood, all are deposited at its expense, all are elaborated by minute arterial ramifications. The various glands of the body, as the salivary, for instance, where peculiar secretions are effected, are organs where coils and meshes of arterial tubes are concentrated to carry on their work; so that the body grows, is repaired, and all its secretions are produced at the expense of arterial blood, with one exception; the bile is elaborated in the liver from venous blood, in venous ramifications.

What is arterial blood? It is blood which has been immediately subjected to the influence of atmospheric air, in the cellular structure of the lungs, in mammalia, birds, and reptiles, or of water in the gills of fishes; and it is the oxygen of the air and of the water which affects that change, or imparts those qualities, by which this vital stream is rendered fitted for the great demands of the system.

It may not here be out of place to allude to the nature of the blood, as far as chemistry has been able to throw light upon it. When this fluid is taken from the body, it quickly separates, if suffered to remain at rest, into two parts, the one part being a fluid termed *serum*, the other a solid mass, called *crassamentum*. The serum consists of water, albumen, muriate of soda, and potass, phosphate of soda, and animal matter. The crassamentum is divisible into two parts, namely, *fibrine*, (which is composed of carbon, oxygen, hydrogen, and azote,) and colouring particles. These colouring particles are globules of extreme minuteness, formerly supposed to contain oxyde of iron in their composition, a theory unsupported by the most modern experiments.

We have said that venous blood is dark, and that arterial blood is bright scarlet; now what is the operation by which this change is effected? It would appear from experiments, that in its course through the system, the arterial blood gradually loses its character as such, in supplying the demands of the vital functions; and at the same time acquires, as it is said, a certain portion of carbon; which carbon, when the blood is sent to the lungs, unites with the oxygen of the atmospheric air, taken in during inspiration, so as to form a compound called by chemists carbonic acid gas, which, with azote, the other principle of the air, is returned during expiration. The blood having thus lost the carbon, to which its dark colour was owing, now becomes of a vivid red. Such is the only change appreciable by chemistry; and various philosophers have endeavoured to ascertain the quantity of oxygen consumed by he human subject in a given space.

Allen and Pepys found it to be 26-6 cubic inches in a minute. Sir Humphrey Davy, 31-6; and Murray, 36.

Various states of the system, however, occasion considerable differences. For instance, the quantity of oxygen consumed is increased by exercise, and, according to Peguin, in a ratio nearly four times greater than when the body is quietly at rest. Prout, however, observes, from numerous experiments, that exercise, when moderate, increases the consumption of oxygen, but that when continued so as to produce fatigue, the consumption is diminished: that the exhilarating passions appear to be attended with an increased consumption; the depressing passions, together with tea, alcohol, (spirits of wine, or liquors,) and sleep, to be attended with a diminished consumption; and that the consumption varies during the twenty-four hours of the day, being on an average greatest in the forenoon, and at its lowest ebb from eight o'clock in the evening till three o'clock in the morning.

In all diurnal animals, the season of their greatest activity is the forenoon, at which time also the consumption of oxygen is the greatest, while lassitude and fatigue come on gradually in the afternoon, when the consumption of oxygen is diminished. In nocturnal animals, the reverse most probably takes place. It would appear, also, that temperature exerts much influence in regulating the consumption of this principle, the quantity being greatest during cold, as if the system under such circumstances had a greater demand upon the sanguinary fluid, in order to the due maintenance of its vital energies. M.

### SCRIPTURE EXPLANATIONS. No. XXIII.

### DIVINATION BY ARROWS.

A POPULAR superstition among the ancient Arabians, was the azlam, or divination by arrows; those used for the purpose being kept in the temple of some idol, in whose presence they were consulted. The art was thus performed: three arrows were enclosed in a vessel; on the first was inscribed, "God command me:" on the second, "God forbid me;" the third was plain. If the first was drawn out, the suppliant prosecuted his design; if the second, he deferred it for a year; if the third, he drew again, until he received an answer,—not forgetting to repeat his present to the idol, or the priest, each time. No affair of importance was undertaken, be it a journey, a marriage, a battle, or a foray, without the advice of these sacred implements. Matters of dispute, such as the division of property or plunder, were settled by an appeal to them. The ancient Greeks practised this sort of divination, as did the Chaldeans; for we learn from Ezekiel xxi. 21, that the King of Babylon, in marching against Jerusalem, "stood at the parting of the way, to use divination, making his arrows bright," (or, as Jerome explains it, mixing and shaking them together,) that he might know which city first to attack.—*Andrew Crichton.*

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## INSECTS. No. XXXVI.

(*Character and Age, concluded.*)

Some insects, as flies, moths, and butterflies, and indeed the majority of these creatures, live a few days or weeks, and a comparatively small number, six, nine, twelve, or fifteen months—a period beyond which, the life of perfect insects rarely extends. Some, however, certainly enjoy a longer existence in the perfect state. Mr. Baker kept one of the darkling beetles alive under a glass upwards of three years. Rosil fed the rose beetle with fruit and moist white bread for as long a period. Esper kept our most common water beetle in water in a large white vessel, feeding it with meat, for three years and a half. Audebert is stated to have kept a spider for several years. In this respect, insects follow a law very different to that which obtains amongst vertebrate animals. In these the duration of their life is in proportion to the term of their growth; those which attain to maturity the latest, in almost every case live the longest. In insects, on the contrary, we often meet with the very reverse of this rule. Thus the larva of the great goat moth is three years, that of the cabbage butterfly not three months, in attaining maturity; yet the perfect insects live equally long. One insect, which in its first state lives four years, lives as a beetle only eight or ten days; some ephemeræ, whose larvæ have been two years in acquiring their full size, live only an hour; while the flesh fly, whose larva has attained to maturity in three or four days, will exist several weeks.

It appears that the stimulus of heat shortens the lives of insects, and consequently that colds tends to lengthen them. Thus Buffon found that, other circumstances being alike, the silk-worm moths placed in a northern, lived longer than those exposed to a southern aspect.

It is also a singular fact, that the drones of a bee-hive are at a certain period slaughtered without mercy by the workers. Their life is, indeed, of very short duration; the eggs that produce drones being laid in the course of April and May, and their destruction being usually accomplished in the months of July and August. The bees then, as Mr. Huber observes, chase them about, and pursue them to the bottom of the hives, where they assemble in crowds. At the same time, numerous carcases of drones may be seen on the ground before the hives. Hence he conjectured, though he never could detect them engaged in this work upon the combs, that they were stung to death by the workers. To ascertain how their death was occasioned, he caused a table to be glazed, on which he placed six hives, and under this table he, being blind, employed the patient and indefatigable Burnens, who was to him instead of eyes, to watch their proceedings. On the 4th of July, this accurate observer saw the massacre going on in all the hives at the same time, and attended by the same circumstances. The table was crowded with workers, who, apparently in great rage, darted on the drones as soon as they arrived at the bottom of the hive, seizing them by their antennæ, their legs, and their wings; and killing them by violent strokes of their sting, which they generally inserted between the segments of the abdomen. The moment this fearful weapon entered their body, the poor helpless creatures expanded their wings and expired. After this, as if fearful that they were not sufficiently despatched, the bees repeated their strokes, so that they often found it difficult to extricate their stings. On the following day they were equally busy in the work of slaughter; but their fury, their own drones having perished, was chiefly vented on those which, after escaping from the neighbouring hives, had sought refuge with them. Not content with destroying those that were in the perfect state, they attacked also such male pupæ as were left in their cells; and then dragging them forth, sucked the fluid from their bodies, and cast them out of the hive.

A fact, the reverse of this, is recorded by Morier, with respect to the locusts. He affirms, that when the female has done laying her eggs, she is surrounded and killed by the males. If this be admitted, two instances have been given in which, by a law of nature, the life of insects is shortened by violence. Still, in these as well as others, the fatal blow is not struck till the creature, however inconsiderable, has fully answered the purposes of its being.

### PARENTAL AUTHORITY.

The ideas of obedience ought to be early and firmly associated with ideas of security and happiness. Hence the imbecility and helplessness of infancy afford us the means of effecting one salutary purpose. Entirely dependent on the wisdom and experience of others, to guard them from the danger to which they are hourly exposed, children might be easily made to learn the advantages of obedience; and thus they infallibly would learn it if obedience were properly enforced. Were all prohibitions made absolute, and the necessity of issuing them guarded as much as possible, so that they should not often occur, it would go far towards rendering obedience natural and easy, for it would then appear a matter of necessity, and, as such, be submitted to without reluctance.

I was some years ago intimately acquainted with a respectable and happy family, where the behaviour of the children excited my admiration. One morning, on entering the drawing-room, I found the little group at high play round their fond mother, who was encouraging their sportive vivacity, which was at that time noisy enough, but which, on my entrance, she hushed with a single word. No bad humour followed. But as the spirits, which had been elevated by the preceding amusement, could not at once sink into a state of quiescence, the judicious mother did not require what she knew could not without difficulty be complied with; but, calmly addressing them, gave the choice of remaining in the room without any noise, or of going to their own apartment, where they might make what noise they pleased. The eldest and the youngest of the four preferred the former, while the two others went away to the nursery. Those who stayed, amused themselves by cutting paper in a corner, without giving any interruption to our conversation. I could not refrain from expressing my admiration at their behaviour, and begged to know by what art she had attained such a perfect government of her children's wills and actions. "By no art," returned this excellent parent, "but that of teaching them from the very cradle an implicit submission. Having never once been permitted to disobey me, they have no idea of attempting it; but you see I always give them a choice when it can be done with propriety; if it cannot, whatever I say, they know to be a law, like that of the Medes and Persians, which altereth not." The happy effects of this discipline were soon rendered more conspicuous, during the very long illness of this amiable mother; who, when confined to her chamber, continued to regulate her family through the medium of her eldest daughter, then a child of eleven years old. Affectionate as obedient, this amiable girl not only attended her mother's sick bed with the most tender assiduity, but, acting as her mother's substitute towards her little brothers and sisters, directed their conduct and behaviour, and was obeyed with the same unmurmuring submission as if their mother had herself been present.

Was her mother so ill as to render noise particularly injurious? All was, by her care, hushed into silence. She invented plays for the little ones, which would make no disturbance, and taught them to speak in whispers. It was a sufficient reward for their forbearance to be told by her that mamma sent them a kiss, and thanked them for their goodness, and that she had been the better for it. What a foundation was here laid for the operation of benevolence!

Let us compare this with the behaviour of an indulged child, to whom the gratification of self-will had become habitual, who had never been taught to submit to aught but force, and to whom submission was consequently hateful, exciting all the painful emotions of anger, indignation, and resentment. I have known such a child make use of a parent's illness as a means of procuring the gratification of all its capricious humours; when, seeing the pains that were taken to prevent noise, it would, on the least opposition, cry out, "If you don't give it me this minute, I'll roar!" and accordingly she would roar till she had what she wanted. What are the dispositions which, in the latter case, must have naturally been inspired? To the pleasing associations attached to the gratification of self-will, the idea of inflicting pain upon others must likewise be attached. What a foundation for that cruelty which is always allied to a tyrannical disposition! Nor is this all. The exultation consequent upon thus carrying her point, must have engendered pride; and pride, by aggravating opposition into injury, brought forth anger and resentment; and from the extravagance of childish humours, this opposition must frequently occur, so that these hateful passions must soon gain the strength of habit, and a propensity to them be for ever fixed and rooted in the disposition. Let us suppose the same indulgence continued through the early stages of youth, in the fond hope that reason will conquer passion as the child advances to maturity. Were the nature of passion, with regard to the influence it has upon the judgment, properly attended to, I believe this fond hope would soon be annihilated. On a mind under the dominion of passion, the calm suggestions of reason can have little influence, supposing the calm suggestions of reason possible in such circumstances. But it is not possible; for to a mind under the dominion of the selfish passions, that appears to be just and reasonable, which is, in reality, unjust and unreasonable in the last degree; because the ideas of just and reasonable are all, by pride, associated with the idea of the gratification of self-will.—*From Miss Hamilton's Letters on Education.*

If this reasoning be correct, and daily facts lamentably prove its correctness, it gives a very humbling view of human nature; and, at the same time, most forcibly urges upon parents the indispensable duty of wisely and firmly using that authority with which Providence has intrusted them, very early and steadily to counteract the risings of innate depravity, and, at the same time, to imbue the infant mind with the principles of christianity, from which alone we may reasonably expect the production of "whatsoever things are just, pure, lovely, and of good report."

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### THE LAW.

There is a law in force with respect to us, the nature of which should be well understood. The laws by which the universe is governed, must all have proceeded from its Creator and Ruler. To determine what is proper to such a government, is reserved to his supreme wisdom; and to enforce it, is the province of his supreme power. Wherever he has bestowed a capableness of serving him, there a law or rule has been imparted, more or less immediately, for its guidance. By means of his will, as thus expressed, the whole of his intelligent creatures are divided into two classes—the obedient and disobedient. The obedient dwell in heaven, and are happy; the disobedient are on earth and in the regions of darkness, and are in a state the opposite of happiness. This is the view of the Divine government which occurs throughout the scriptures; and, regarded thus generally, it commends itself to our ordinary notions of rectitude.

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### GOD IN CHRIST.

God was in Christ reconciling the world unto himself, not imputing their sins unto them, 2 Cor. v. 19. Because, as God stands in relation to man according to the tenor of the covenant of works, and so out of Christ, he could not, without prejudice to his justice, be reconciled unto them, nor have any thing to do with them otherwise than in wrath and indignation; therefore, to the intent that justice and mercy might meet together, and righteousness and peace might embrace each other, and so God stand in relation to man according to the tenor of the covenant of grace, he took our nature, and became "God manifest in the flesh," that so he might speak peace to his people. Sweetly, saith Luther, because the nature of God was otherwise higher than we are able to attain unto, therefore hath he humbled himself unto us, and taken our nature upon him, and so put himself into Christ: here he looketh for us, here he will receive us; and he that seeketh him here shall find him. This, saith God the Father, is my well-beloved Son, in whom I am well pleased, Matt. iii. 17. We must not think that this voice came from heaven for Christ's own sake, but for our sakes, even as Christ himself saith, John xii. 30. The truth is, Christ had no need that it should be said unto him, This is my well-beloved Son; he knew that from all eternity, and that he should still so remain, though these words had not been spoken from heaven: therefore by these words God the Father, in Christ his Son, cheereth the hearts of poor sinners, and greatly delighteth them with singular comfort and heavenly sweetness, assuring them, that whosoever is married unto Christ, and so in him by faith, he is as acceptable to God the Father as Christ himself, Eph. i. 6. He hath made us accepted in the Beloved. Wherefore, if you would be acceptable to God, and be his dear child, then by faith cleave unto his beloved Son Christ, so shall the love and favour of God be as deeply insinuated into you as into Christ himself; and so shall God the Father, together with his beloved Son, wholly possess you and be possessed of you; and so God and Christ and you shall become entirely one, according to Christ's prayer, John xvii. 22; "that they may be one in us, as thou and I are one."—*Marrow of Modern Divinity.*

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listlessness is felt, after remaining for some time in one position, without exerting the action of the muscles. This feeling would seem to arise from the sluggishness of the circulation, and the accumulation of blood in the venous system at large, which requires an impetus from muscular activity, in order to its due circulation.

But it may be asked, is not the blood wasted by the various secretions which are elaborated at its expense? It is; and its stores are at the same time as regularly replenished. The nutritious particles of the food we eat, become blood, by a process which baffles the researches of the chemist, and shows us how little we know of life and organization.

The office of the digestive organs is to convert food into chyle; to speak more definitely, we may state the progress as follows:—When the food is received into the stomach, it becomes mixed with the salivary and gastric fluids, and by their agency is dissolved into an uniform pulpy mass, termed chyme; this is its first change: it now passes into a portion of the alimentary canal, termed the *duodenum*, and there becomes mixed with the *pancreatic* juice and the bile, and by the action of these fluids a complete conversion is effected on that portion fitted for the purposes of the animal economy, which is termed *chyle*. This chyle is immediately taken up by multitudes of minute tubes which proceed from the inner surface of the alimentary canal, and are termed *lacteals*. If we examine these tubes in an animal recently killed, and before the vital warmth is extinguished, we shall see them (at least if the animal has been recently fed) filled with a milky fluid, whence their name of lacteals: this fluid is the chyle. The lacteals having thus absorbed this nutritive preparation of the food, after communicating freely with each other, pass through certain glands, termed the *mesenteric*, where the chyle appears to acquire new properties. Emerging from these glands, the lacteals carry the chyle onwards till they enter at last into the *thoracic duct*, a vessel which passes up along the spine, and pours the chyle into the left subclavian vein, just where it becomes united to the *vena cava;* here it mingles with the blood. It has not, however, yet fully acquired the ultimate change: received with the venous blood by the heart, it is thence sent through the lungs and again returned to the heart, incorporated with the rest of the vital fluid, of which it now forms a part in every sense, to be sent out to nourish the system. The thoracic duct does not, however, only receive the lacteals; for the absorbent vessels of the skin, as well as of every part of the frame, here also terminate, so that whatever they take up, or remove, goes through the above process. How wonderful, how mysterious, how little understood, are our own bodies, which are fearfully and wonderfully made! Our life, moment by moment, depends on the nice and delicate adjustment and action of a thousand minute parts or organs, of which multitudes have never even heard; the slightest flaw deranges the mechanism of the animal machine, and death ensues; yet there are men who see nothing of beauty, nothing of glory, nothing of Almighty power, in the workmanship of these vital tenements, the temple of a never-dying soul. Let us, while we contemplate the subject, bow with heartfelt adoration before our Lord and Maker.

Into the nature of animal temperature, or the laws of vital heat, (which while it appears to be connected intimately with the circulation, is also no less so with the energy of the nerves,) we shall not attempt to enter. No theory as yet laid down is at all satisfactory; it appears to depend neither on chemical nor on mechanical principles, as some have imagined, but to be associated in some mysterious manner with the principle of vitality; a principle exhibited in the innumerable operations continually taking place in the organic frame, in those endless combinations and decompositions involving perpetual electrical changes, and that strange energetic influence of the nerves, whose true nature and mode of action are veiled in obscurity.

While we thus regard the structure and operations of our mortal fabric, let it be to us a theme of profit and instruction, remembering that the appointed time cometh, when the silver cord shall be loosed, "the golden bowl broken, the pitcher broken at the fountain, the wheel broken at the cistern, the dust returning to the earth as it was, and the spirit to God who gave it." M.

## SCRIPTURE REFERENCES TO THE HEART.

The Hebrews look upon the heart as the source of wit, understanding, love, grief, and pleasure. Hence are derived many ways of speaking. An honest and good heart; that is, a heart studious of holiness, being prepared by the Spirit of God to entertain the word with due affections, dispositions, and resolutions, Luke viii. 15. We read of a broken heart, a clean heart, an evil heart, a hardened heart, a liberal heart; a heart that does an act of kindness freely, voluntarily, with generosity. To incline the heart to God; to beseech him to change our stony hearts into hearts of flesh; to love with all one's heart, &c. To turn the heart of the fathers to the children, and the heart of the children to their fathers, Mal. iv. 6; that is, to cause them to be perfectly reconciled, and that they should be of the same mind. "Let no man's heart fail;" let no man be discouraged, 1 Sam. xvii. 32.

To want heart, sometimes denotes to want understanding and prudence, Hos. vii. 11. "Ephraim is like a silly dove without heart; they call to Egypt, they go to Assyria." They have no judgment or understanding of the right way, to free themselves from their troubles, which is seen in their seeking to Egypt and Assyria. "O fools, and slow of heart," ignorant men, without insight and understanding, Luke xxiv. 25. "This people's heart is waxed gross —lest they should understand with their heart," Matt. xiii. 15. Their heart is stupified, so as to be destitute of understanding; they resist the light, and reject all impressions of truth. "The prophets prophesy out of their own hearts," Ezek. xiii. 2. They prophesy according to their own inclinations and affections, and what their own imaginations suggest to them, without any warrant from God.

To lay any thing to heart, is to set one's heart on any thing; that is, to remember it, to apply one's self to it, to have it at heart. "No man layeth it to heart;" no one concerns himself about it, Jer. xii. 11.

The heart dilates with joy, contracts with sadness, breaks with sorrow, it resists truth; grows fat and hardens in prosperity; God opens it, prepares and turns it as he pleases. To steal one's heart, is an expression in Gen. xxxi. 20, margin, "Jacob stole away the heart of Laban;" that is, he went away without his knowledge and consent. The heart melts under discouragement; the heart forsakes one under terror; the heart is desolate in amazement; the heart is fluctuating in doubt. To speak to the heart, means to comfort, to say pleasing and affecting things to any one.

By the heart likewise, the middle of any thing is meant: Tyre is in the heart of the seas, in the midst of the seas, Ezek. xxvii. 4, margin, "We will not fear, though the mountains be carried into the heart or midst of the sea," Psalm xlvi. 2. "As Jonas was three days and three nights in the whale's belly; so shall the Son of man be three days and three nights in the heart of the earth," in the grave, Matt. xii. 40.

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## HOSPITALITY OF THE ANCIENT ARABS.

The virtue of hospitality often degenerated into foolish extravagance; and there were individuals who strove to outdo each other in deeds of romantic generosity. Those who excelled in the magnificence of their bounty, were crowned with wreaths, as if they had conquered at the head of an army. The liberality of Hatim was proverbial, and has immortalized the tribe of Tai. The suppliant he never dismissed from his tent unrelieved. Often were forty camels roasted at a single feast; and, in a season of extreme scarcity, he killed the only horse he possessed, so valuable, that the Roman emperor had sent an embassy on purpose to procure it. Hatim's benevolence was hereditary; his father rejoiced when he had emptied his folds to feed the hungry, and his mother was interdicted from giving alms for a whole year, lest her prodigality should reduce the family to beggary. He himself was so inconsiderate as to distribute the greater part of his flocks among a troop of needy poets on their way to the court of Hira. His beneficence was as unwearied as it was extensive. On the longest and darkest nights, he would leave his bed, if some hapless pilgrim required shelter; and, wrapt in his cloak, procure with his own hands a light from some neighbouring tent. Not satisfied with kindling his "fires on the mountains," he would send forth his dog; that, by its barking, strangers might know where to find a place of rest. His memory was revered over all Arabia; and a female captive, taken in battle, regained her liberty, when she pronounced herself to be the daughter of Hatim Tai.

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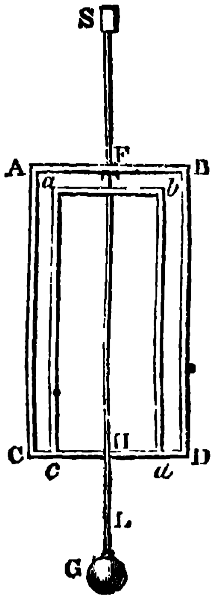
## THE PENDULUM.—No. II.

The increase or decrease of temperature has a considerable influence on the oscillations of a pendulum. A bar of metal which when cold will pass easily between two uprights, will not do so when heated red-hot, for heat expands solid metallic bodies. For this reason, a pendulum which beats seconds in a low temperature, would cease to do so if taken into a hotter climate, for its length would be increased. This a fact of great importance in horology, and mechanics have invented various methods of compensating for this alteration in the length of the pendulum ; sometimes by making the rod of the pendulum of a substance that would not expand appreciably by heat, and sometimes by contrivances that correct the increase of length that results from a change of temperature. The length of a rod of dry wood is not altered by a change of temperature, and it would be the best possible contrivance, if it could be perfectly protected from the hygrometric action of the air. It is, however, in a considerable degree defended from moisture, when rubbed over with bee's wax, and makes the most accurate pendulum of this sort, when thus prepared.

The two best compensation pendulums, are the mercurial and the gridiron. The mercurial pendulum consists of a rod of brass, or other metal, to the end of which a cylindrical vessel containing mercury is attached instead of a ball. The same increase or decrease of temperature that affects the pendulum rod has an influence upon the mercury in the vessel, and the one corrects the other. If the rod suffers expansion, the centre of oscillation will rise; but if the mercury be duly proportioned, its expansion will be such, that the distance of oscillation from the point of suspension will be always the same, and therefore, whatever may be the variation of temperature, the pendulum will beat seconds.

The gridiron pendulum was invented by Mr. John Harrison, and is a very ingenious and useful instrument. It is well known, that the different metals and metallic alloys, expand variably under the influence of the same change of temperature. It is therefore evident, that bars of different metals may be so arranged as to correct each other's expansion when used in the construction of pendulums.

Let G be the bob of a pendulum, and S the point of suspension: A, B, C, D, is a steel frame, to which is attached the rod S, F; and *a*, *b*, *c*, *d*, is a frame of some other metal, and is attached to the rod C, D, at the points *c*, *d*. At T the rod T, L, is suspended, passing freely through the hole at H. Now if the temperature be raised, the frame A, B, C, D, will dilate downwards, that is, C, D, will be carried further from the point S; and if the mass of the pendulum be thus brought downwards, it will no longer beat seconds. But the frame *c*, *a*, *b*, *d*, is also expanded, and the expansion is upwards, so that while C, D, is lowered, *a*, *b*, will be raised. Now, if we suppose *a*, *b*, to be raised as much as C, D, is lowered, the distance of *a*, *b*, from S will remain unchanged. But the increase of temperature which expands the other parts of the instrument, expands the rod T, I, and therefore the distance between G and T are proportional. Now, looking at the instrument generally, we observe that S F, A C, T L, when expanded by increase of temperature, tend to increase the distance between S and G, that is, the point of suspension and the bob. To prevent this, we must make the frame *c*, *a*, *b*, *d*, of such a metal that its expansion upwards may exactly neutralize the combined downward expansions, and thus the distance between S and G will be preserved.



The great use of the pendulum is in its application to clocks, but when we speak of pendulums being adapted to clocks for the purpose of measuring time, it must not be supposed that they are the moving power, for they merely act as regulators, and the motion originates in the fall of a heavy weight, or in the recoil of a spring attached to the machine. Weights are invariably used for clocks, springs in watches; but the latter are generally regulated by a balance-wheel, and not by a pendulum. The contrivance by which the pendulum of a clock is connected with the train of wheels, and regulates their motion, is called the escapement; and of this we have several varieties, as the lever, and the dead-beat escapement, the last being so named on account of its very peculiar sound.

We have hitherto spoken of pendulums

as vibrating in the arc of a circle, but there is a mathematical curve called a cycloid; and if the bob of a pendulum could be made to vibrate in it, its oscillations would all be performed in equal times whatever the length of the arc. The cycloid is that curve which is formed by the revolution of any point on the circumference of a circle, the circle itself being made to revolve on a plane. There are some very remarkable principles which might be mentioned in reference to this curve. Of all paths not in a straight line, the cycloid is that in which a body can pass the most readily from one point to another. The right line is of course the shortest path between two bodies, and if a man in a balloon would throw a stone to some point on the earth in the shortest path, he would cause it to take the direction of a right line, but if he wished to throw the stone in the line of shortest descent, it must be made to move in the cycloidal curve, for it would not only reach its destination sooner, but would strike the object with greater energy. The study of the mathematics has taught man this truth, and instinct has taught the falcons to fly in the cycloidal curve; and it is in consequence of their flying in a cycloid when attacking their prey, that they possess so great a velocity, and strike with so great a force.

Ingenious mechanics have attempted, for the reasons already stated, to cause the pendulum to vibrate in this curve; but hitherto with little success; for so few of the practical difficulties have been removed, that it is not probable that this desirable object will ever be accomplished.

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### A COMMUNITY OF DRUNKARDS.

I HAVE heard strong objections to any interference with the habits of society; and, it has been said, that it infringes upon the rights of individuals to prescribe sobriety to them, and to put them to any inconvenience, because they choose to get drunk. Much fault has been found by some, with an opinion which I have expressed, that drunkenness ought to be punished. One person told me I was "strait-laced"—what he meant is for him to say. If he means I am a bigot and a "coercion" man, I will promise to amend, and to take his side of "non-interference" upon one condition, and that is, that drunkards shall form a community for themselves. Let them live in separate towns; let them have a "Tadmor in the Wilderness," if they will. At a proper distance from all sober towns, let a DRUNKEN TOWN be established. Let them be a distinct community, as far as may be. I was amusing myself with imagining such a society—all drunkards. I thought a goodly town was built for them, with every convenience that art could wish, walled round, as was fitting (for drunkards are poor defenceless things) with just one sober man to lock the gate, and to keep out sober intruders. I thought they were all "settled" at last, and gone to bed as "comfortable" as they could wish, each having a good "night cap," and I watched to see how they came on next morning. The first that rose was "a gentleman," of course, that had taken up his night's rest upon a dung heap,—what is called in Yorkshire a "muck midding," and a very decent dormitory for a drunkard. He went to knock up the priest of a gin temple, which was no easy matter. This done, he demanded "a morning," if you know what that is, of the best sort; but it now turned out that the lady of the house having had "a drop too much," had left the tap running, and it was all gone! And now to the cellar; but here again was bad luck, for the key was lost! Misfortunes seldom come singly; for the "gentleman" who applied for his "morning," had no sooner begun to smack his livid lips, after tasting it, than he discovered that his purse was lost. It appeared that this was to be market day; but, alas! where was the market? Butchers had been so busy "enjoying themselves," that the carcases were undressed. Drovers were detained on the road after taking "a little drop too much." The bakers had, in pursuit of "good fellowship," forgotten their bread batches. The carrier, whom the grocers had sent to the neighbouring sea-port for supplies of tea, sugar, and gin, was "at a lock," in consequence of "a little conviviality" he had indulged in. The miller, the honest miller, appeared as if some one had thrown dust in his eyes, for he had left the mill-dam gates open, and the water was gone. Crispin, the shoemaker, "to oblige his customers," had just spent a few evenings "in a free way," till the lap-stone was mouldy, and his worthy neighbours were barefoot. The tailor and his goose had quarrelled; he had only been a few days at the sign of "the last shift," "to drive dull care away."

The lawyer's eyes were both bunged up, so that he could not see his client's brief; and the doctor's nerves were so unsteady, that he could not discern whether his patient's pulse was 60 or 199.—*Rev. G. S. Bull.*

## ANECDOTE.

### ARE YOU QUITE SURE?

An officer in Uhlan's corps of cavalry, says Major Keppel, well known to the consul, was walking along the streets, when a Bulgarian woman rushed out of her house, and ran towards him, exclaiming, "My dear boy! what! now that you are in a fine dress, are you ashamed of your poor mother?" Soon after, an older woman claimed him for her grandson, and the younger branches of the family hailed him as a brother. He managed to make his escape for the time; but in passing, shortly after, through the streets, he was upbraided for his unnatural conduct in disowning his relations. Thus assailed, he applied to Count Diebitsch for protection. An inquiry was instituted through the medium of the Bulgarian archbishop. The parties were confronted; the supposed mother called out, "If it be my son, he has a scar on the left side of his forehead." The officer's cap was removed, and, strange to say, the scar on the identical spot appeared. The woman triumphantly exclaimed, "He had that scar when he was eight years old." But here several Russian officers interposed, and said that the officer had left St. Petersburgh without that scar, and had received it in an affair with the enemy, before Shumla. Be not too positive, is a maxim, which this, as well as many other facts, will strikingly illustrate and enforce.

## A COMMON MISTAKE.

I have always, in every different state of life I have hitherto been in, thought that the troubles and difficulties of that state were greater than those of any other state I proposed to be in; and when I have altered, with assurance of mending myself, I have still thought the same; yea, that the difficulties of that state are greater than those of that I left last. Lord grant that from hence I may learn to withdraw my thoughts, affections, desires, and expectations, entirely from the world, and may fix them upon the heavenly state, where there is fulness of joy; where reigns heavenly, sweet, calm, delightful love, without alloy; where there are continually the dearest expressions of this love; where there is the enjoyment of this love without parting; and where those persons, who appear so lovely in this world, will be inexpressibly more lovely and full of love to us. How sweetly will those who thus mutually love, join together in singing the praises of God and the Lamb. How full will it fill us with joy, to think that this enjoyment, these sweet exercises, will never cease or come to an end, but will last to all eternity. Remember, after journeys, removals, overturnings, and alterations, in the state of my life, to reflect and consider, whether therein I have managed the best way possible respecting my soul; and before such alterations, if foreseen, to resolve how to act.—*President Edwards.*

## IMITATION.

Ælian tells us that he had heard of a law in force among the Thebans, which commanded all mechanics, painters, and potters, to surpass their models, or, to translate the Greek phrase literally, to imitate them for the better; and, that the enactment might not be merely a dead letter for want of a sanction, a fine was directed to be imposed upon all who should be found at any time imitating for the worse, or falling short of the excellence of their respective patterns. Ælian, Lib iv. cap. 4.

A law of this nature was more just in theory, than easy of execution; yet a reference to the reason and spirit of it may suggest a useful hint to all learners, whether in religious or civil knowledge; for nothing tends more to keep us below mediocrity, either in spiritual or natural attainments, than the being contented to come behind what are currently looked upon as models for imitation; for it often happens, that in strictness these repeated models fall far short of any standard of real and unquestionable excellence.

## THE WONDERFUL CHANGE.

How wonderful a thing, my brethren, is the soul of man! by first creation, of kindred with the holy angels and with God; by the fall, debased in fleshly lusts and vile affections. In what danger once, through original and actual sin; and yet, for a long time, as insensible of danger, as the child sleeping on the edge of the precipice! Brought at length, in a mysterious way, to repent and to acquiesce in the wondrous plan of salvation; made, through grace, a true believer in the meritorious righteousness and death of Jesus Christ, and a real partaker of the glorious privileges procured for sinners by his mediation; there, arrived at that point, the soul, we might have thought, will know no more such strange vicissitudes; all henceforth will be uniform joy and peace; the vessel, having weathered such a storm, will sail on in smooth waters, till she reaches the wished-for haven ——.

But there is a conflict thus described by the apostle, Rom. vii. 22, 23: "For I delight in the law of God after the inward man: but I see another law in my members, warring against the law of my mind, and bringing me into captivity to the law of sin which is in my members." The true believer is a new creature. It is through the Holy Spirit deeply convincing of sin, leading the burdened soul to Jesus Christ for pardon, and so first implanting and then nourishing true faith; it is only thus that any man with the heart believeth unto righteousness. And in this process, the Holy Spirit infuses a cordial hatred of sin, and a genuine desire after holiness; so that faith worketh by love, Gal. v. 6, the love of Christ constraineth all who believe in him for justification, 2 Cor. v. 14.

And now, the believer has new views, new pleasures, and new pursuits. He has far other thoughts of God than once; the world's vanities have lost their charm; he lives to a new object, even to the glory of his God and Saviour, an object which once had no place in his concern. And whence this change? Is it through his own wisdom and strength, or through man's persuasion and influence? It is, brethren, only through the power and grace of the Holy Spirit. He only can have softened the heart once hard as adamant, subdued the spirit once so proud and self-willed, turned the current of the affections once following the course of this world, and have produced this grand change in the whole character and life. The scripture calls it a regeneration, and so it is, for there is a new nature, a new heart, a new spirit, and a new life. The scripture calls it an awakening from sleep, 1 Cor. xv. 34, a spiritual resurrection, Eph. v. 14, the being quickened when dead in trespasses and sins, Eph. ii. 1, Col. ii. 13; and although these expressions are the strongest which language can supply, they are not too strong to describe the grand reality of what takes place, when any of your souls are brought out of ignorance, worldliness, vanity, and a sinful course, into penitence, faith, love to God, adoption into his family, and the animating desire to live to his glory. If any of you understand it not, it is high time ye did, "Ye must be born again," John iii. 7.—*Hambleton.*

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### SOLITUDE.

More and greater sins are committed when men are alone, than when they keep themselves in fellowship. When Eve, in paradise, walked alone, then came the evil one and deceived her. Whoever is amongst men, and in honest company, is ashamed to sin; or, at least, he has no place or opportunity to do so. When king David was alone and idle, and went not out into the wars, he fell into adultery and murder; and, I have myself found, that I have never fallen into more sin, than when I was alone. Solitariness inviteth to melancholy; and a person alone hath often some heavy and evil thoughts; so hath he strange thoughts, and construeth every thing in the worst sense. Melancholy is an instrument of the devil, by which he accomplishes his wicked purposes. The deeper a person is plunged into that state, the more power the devil hath over him. To live in an open, public state, is the safest. Openly, and amongst other persons, a man must live civilly and honestly; must *appear* to fear God, and do his duty towards men.—*Luther's Table Talk.*

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### IMPORTANT HINTS.

He who cannot find time to consult his Bible, will find one day that he has *time* to be sick; he who has no time to pray, must find time to die; he who can find no time to reflect, is most likely to find time to sin; he who cannot find time for repentance, will find an eternity, in which repentance will be of no avail.—*H. More.*

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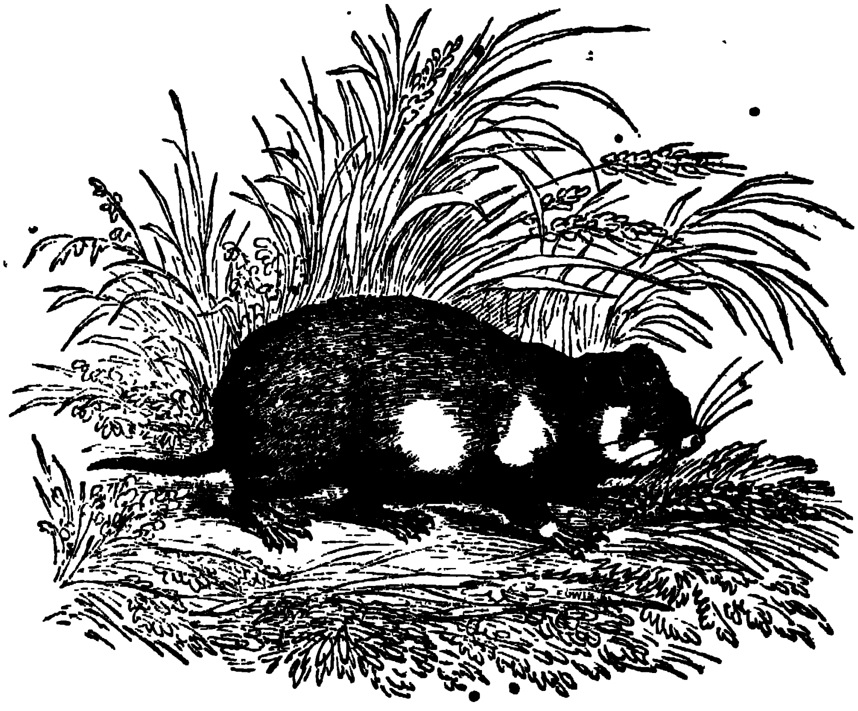

THE HAMSTER.

## THE HAMSTER.

*(Cricetus Vulgaris.)*

THE little animal which we now introduce to the notice of our readers, belongs to the order rodentia, and is one of the most curious of the mammalia of Europe, but at the same time, one of the most injurious, as it regards the interests of the inhabitants of the districts in which it is found. Inoffensive in its manners, and prettily ornamented with a variety of well-disposed markings on its soft fur, it gains no admiration, but is regarded with dislike, as a despoiler of human industry. It robs the fields of their most valued produce, and that, in no stinted measure, filling its own magazines with hoards of the finest grain.

In size the hamster equals a rabbit of six weeks old; it is spread over the whole of the flat, or sandy districts, from the north-east of Germany, as far as Siberia.

In Poland, Ukrane, and the adjacent parts of Russia, (an immense corn tract,) it is especially common, living in burrows of great depth, and most ingeniously constructed, having various chambers adapted, some as reservoirs for the corn, others as apartments to lodge in.

The depth to which these subterranean retreats are carried is often seven or eight feet. The passage runs obliquely downwards, till it terminates in several chambers or excavations sunk perpendicularly; one being reserved as the dormitory of the inmate, and lined at the bottom with a bed of dried herbage or grass; the others designed as granaries, to which at all times there is a ready access. In this dormitory the female brings forth and rears her young, of which she has five or six at a time; twice or thrice a year; so that the increase of the species, were it not checked by counterbalancing causes, would be almost illimitable, and produce dearth and famine. The hamster, however, has innumerable enemies; beasts and birds of prey attack and destroy it, and so thin its numbers, as to keep the annual increase equalized by the annual diminution. Nor is it an unimportant agent in its own destruction. The males fight desperately with each other when they meet, the weaker usually falling a sacrifice, and these contests are said to be very frequent.

In August, the hamster begins to gather in its winter stores. As in certain of the monkey-tribe, it is furnished with cheek-pouches, which serve to carry the grain to the appointed reservoir; these it crams as full as possible, and returns home with its load, which it discharges by pressing the forepaws (using them in the manner of a squirrel) against the sides of the cheeks, so as to extricate the contents. The hoards thus industriously accumulated are sometimes enormous; in some instances the astonishing weight of a hundred pounds of grain has been found amassed in a single store-house. This, however, is not commonly the case; still it is always considerable, and when we reflect that this system of robbery is carried on by thousands of these animals, even in an area of moderate extent, we may form some idea of the aggregate of the loss arising from their destructive propensity. Though the hamster lays up a winter store, still it is one of those animals that hibernate, or pass the severer season in a state of lethargy. This lethargy is most probably but of short duration, or interrupted, as in the porcupine and hedgehog, by periods of reviviscence, when it rouses itself to take its food. Warned, by the increasing chillness, of the approach of the winter, it retreats to its subterranean dwelling, where it has laid up its provisions, and carefully stops up the entrance, there to wait, in tranquil repose, till the return of spring.

The length of time which intervenes between the period of its retirement and the state of lethargy into which the hamster ultimately sinks, is not ascertained; we may consider, however, that it depends much upon the temperature of the earth around it, and the depth to which the frost has penetrated. The lethargy of the hamster, during its hibernation, is complete. It reposes rolled up, on its bed of straw, its head being bent between its forelegs, and the hind ones being drawn forward to meet them; the eyes are closed, and the respiration (as in the bat and dormouse, &c.) is suspended, while the vital heat is scarcely higher than that of the atmosphere. It awakens from this life-preserving trance early in spring, when its stores, collected the preceding autumn, are of main importance, as they are the only means of support till the season is farther advanced, and the verdure of the ground renewed.

Its colour, on the head and upper parts, is reddish-grey, verging to yellow on the face; the under parts are black, with the exception of the throat and feet, which are white; three large distinct spots of white are also disposed on each side; one on the cheeks, one on the shoulders, and one on the ribs. The fur is fine and soft, the ears are moderate and rounded, the eyes small, the nose pointed, the tail short, and covered with close hair. Besides the present animal, several species have been discovered in Siberia, and the border countries. M.

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### CHOLERA IN SWEDEN.

The Rev. George Scott, of Stockholm, states the following particulars, in a letter dated September 26, 1834:—

About three years ago, that fearful disease, the malignant cholera, raged in the neighbourhood of Sweden, and excited great alarm in the country; but, through the especial providence of God, this pestilence, to the astonishment of all Europe, travelled round the coast without making one attack. The gloom which before overhung the land, then gave place to this giddy people's accustomed lightness; and, instead of devoutly and gratefully acknowledging the sparing mercies of the Lord, they talked of efficient quarantine regulations, the features of the country, its rocks, and lakes, and falls, as proving impregnable barriers to the disease.

Some time after this, the cholera appeared in Norway: and thus a second warning was given to this land; but its residence was too short, and the mortality too insignificant, to rouse the Swedes to serious thought. This also passed away; every thing returned to its usual course; the quarantine establishments were discontinued; and on the meeting of the Diet last January, the assembled States presented an address to His Majesty, thanking him for the excellent arrangements adopted in guarding the coasts against this fearful destruction. The Divine protection was here certainly adverted to, but no acknowledgment of national guilt was made; no call to national repentance heard, either in the speech with which the King opened the Diet, or in the address now alluded to. The disease itself seemed to be forgotten till about the end of July last, when news arrived at Stockholm that three deaths, after a few hours' illness, had taken place in one house in Gottenburgh. The number of deaths increased daily; yet for some time the physicians would not acknowledge that the disease was the Asiatic cholera. It continued, however, to rage with dreadful malignity; and the awful result of its ravages there, is the diminution of the population to the extent of one-eighth, nearly three thousand persons having been swept away by this scourge. The next place attacked was Jonkopong, where at least one-seventh part of a population of four thousand fell before the disease. Scarcely an individual in this town has escaped an attack, more or less severe.

Not to mention several villages partially visited, the cholera appeared in Stockholm on the 19th of August; but the official reports only commence with the twenty-fifth; and from that date up to the twenty-fifth of September, the number of cases reported is 7,312; of deaths, 3,126; of sick, then remaining in hospitals or private houses, 1,444. The greatest number of new cases on any single day was 541, on the 9th of September; of deaths, 217, on the 11th. When the population of Stockholm, namely, eighty thousand, is remembered, it will be seen with what violence the cholera has exerted its destroying energy in the capital. Thanks be to God, he is removing this heavy visitation, and in wrath remembering mercy. The last day's report gives only one hundred and eight new cases, and twenty-eight deaths.

Without losing sight of the finger of God, to whose decree alone this visitation must be traced, several circumstances may be mentioned which, humanly speaking, greatly aggravated the evil. The summer was exceedingly sultry; the heat unwonted; and for weeks together unmitigated by a single shower. Not unfrequently the thermometer, as well in Gottenburgh as Stockholm, stood as high as 116° in the sun, and 90° in the shade. This state of the atmosphere induced an uninterrupted and copious perspiration, took away all desire for solid food, and occasioned the drinking of an unusual quantity of liquid; whereby the digestive organs especially were much injured, and the population generally predisposed for the disease.

In Gottenburgh a universal panic seized the inhabitants; several hundreds of those who possessed the means, fled from the town; not a few of the authorities, who ought to have directed the arrangements, were unfortunately absent; and the calamity burst upon the place so unexpectedly, that little had been done in the way of preparation. The number of medical attendants was utterly insufficient. It is true, five were despatched from Stockholm, and as many from Copenhagen, as soon as possible; but ere this reinforcement arrived, the resident practitioners were so worn out, that some of them were necessitated to keep their beds. The supply of medicine was speedily exhausted: two or three hundred persons at once besieged the doors of the laboratories, urgent for drugs, which could not be given them; till at length the apothecaries closed their shops against the public, and only the prescriptions of physicians were attended to. Persons to bear the sick to the hospitals, or the dead to the burial-ground, and nurses to attend the patients, could not be obtained for a time, till a voluntary association of burgesses was formed, by the example and influence of which a few, but still an inadequate number, of the lower orders consented to act.

The medical attendants laboured with unwearied diligence; but they began to fail through excessive fatigue, when the Lord in compassion said, "Spare;" and the number of cases rapidly diminished. A considerable proportion of the middle and higher classes have fallen before the destroying angel; and, as if to mock the arrangements of human wisdom, the individual raised on the saturday, by the vote of the four States, to the responsible office of commissioner, to watch over the administration of the laws during the five years which intervene between every Diet, was seized with cholera on the sabbath, and died on the same night; and a very promising young nobleman, (Count Cronhjelm,) from whose enlightened and energetic services much political good was expected, died shortly after his appointment by the Diet to the president's chair in the bank direction.

The principal editors of newspapers combated the opinion of this visitation being a Divine judgment on the nation, and exhorted the clergy to avoid publishing any such notion to their flocks. The Government, however, acknowledged the Divine hand, by a form of prayer, which was ordered to be read in all the churches, of which the following is a literal translation:—"Lord our God, fatherly in thy chastisements as in thy gifts, we have enjoyed them richly and long. O that we had been wise, and not neglected our day of grace, neither abused the riches of thy goodness! The time of visitation is come. That destructive plague, from which Thou for so long a time preservedst us, now spreads even in our land dread and sorrow. O our fathers' God, we know not what Thou hast decreed concerning us; but we know that from Thee only proceed life and death. Lord of life and death, we humble ourselves under thy mighty hand. Grant patience under suffering; hope and confidence in Thee, when human help is no more. Incline our hearts to reverence thy holy commandments, obedience to our beloved rulers, to mutual love, aid, and comfort. Then, O Father, Thy will be done, whether it be for life or death! Before Thee, then, Eternal Compassion, do we prostrate ourselves with our petitions, confiding, not in our own righteousness, but in Thy great pity, for Jesus Christ's sake. Amen!"

At the same time, the Consistory of Stockholm exhorted the clergy of the capital to urge on their hearers the propriety of each one setting his house in order, and seeking, while in health, a preparation for sudden death. But no day of humiliation was set apart; no call to national repentance heard; no effort made to improve the visitation as a means of awakening sinners.

It would be no difficult matter, were it necessary, to make out a dark catalogue of national sins, each meriting such a visitation as that now sent. The word of God is lamentably neglected or ridiculed; the sabbaths of the Lord most disgracefully profaned; the solemnity of that day seems a thing unknown, and unacknowledged. Individuals and corporate bodies hesitate not to find their own pleasure on that day; and in the most public manner show their disregard for the holy sabbath. The theatre, and similar places of amusement, are regularly opened on the Lord's day evening; and I have known no less than twenty-one public balls advertised to be held in Stockholm on one sabbath. "Shall I not visit for these things? saith the Lord."

Another crying national sin is the abuse of the precious fruits of the earth. Considering the nature of the soil and climate here, the goodness of God is conspicuous in granting generally a sufficient crop; but the food of the land, the grain that God so kindly vouchsafes, is destroyed to produce that curse of the country, brandy. Nothing is laid up to meet the possibility of a failing crop the next harvest; and thus what is granted by the Creator to feed and strengthen the inhabitants, is perverted into the instrument of their poverty, feebleness, and demoralization. More than thirty millions of gallons of this destructive fire-water are annually consumed by a population of three millions!

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## WIND.

SENECA defines wind to be air flowing, and he illustrates this by saying, that a current of air is to the atmosphere during a calm, what a river is to a lake. Nothing is wanted to complete the accuracy of this definition as far as the effect is concerned. But Seneca, though he refutes and exposes some erroneous attempts to explain this phenomenon, and asserts that the air has the power of contracting and expanding itself, yet seems not clearly to have seen that this contraction and expansion were caused by the agency of heat alone. To include the effect and the cause in the same definition, wind may be defined, a current of air moving in one direction to restore the equilibrium, which has been broken by the rarefaction caused by the excess of heat in one place, above that of another; or, in the words of Professor Playfair, "the disturbance of the equilibrium of the atmosphere by the unequal distribution of heat."

To exemplify this description, we may begin with the most striking instance, and say, as the air will always move from the colder to the warmer regions, that if the earth was at rest, and its surface covered with water, an atmospheric tide would flow in an uninterrupted manner from the poles to the equator, and return again towards the pole by an upper current.

This motion is combined with the motion of the earth in its rotation round its axis; hence we have, on the north side of the equator, a north-east, and on the south side, a south-east wind, gradually declining towards the east as we approach the equator. This is called the trade wind, and is the most considerable and extensive instance of irregularity. But, after this, there is a numberless variety of causes, which produce further irregularity: one of them in particular consists in the different capacities which the parts of the earth's surface have for acquiring and communicating heat. The sea, for example, that washes the margin of an island, will have a greater capacity for heat than the land, because the heat penetrates into the mass of the body heated with greater facility in one case than in the other: hence the air at the surface of the earth will be warmer than it is at the surface of the sea; and consequently, the air, moving to the warmer spot, we shall have a sea breeze. At night, on the contrary, the heat will pass from the earth's surface with greater rapidity by radiation, than it does from that of the sea, the air will be of course warmer at sea than on land; the breeze will therefore set in from the land to the sea; whence the land breeze.

Mr. Clare exemplifies this by the following experiment:—

"In the middle of a vessel of water, place a water-plate of warm water, the water in the vessel representing the ocean, and the plate the island, rarefying the air above it. Then hold a lighted candle over the cold water, and blow it out, and the smoke will move towards the plate. But if the plate be filled with cold water, and the fluid in the vessel be warm, the smoke will move in a contrary direction.

If we advance near a marsh, or enter a wood in warm weather, a cool breeze proceeding from them seems to welcome our approach. The air which has been cooled by evaporation in one case, and by a shade impervious to the sun's rays in the other, is in motion to restore the balance, which has been disturbed by the greater warmth of the circumambient atmosphere, or that which is extended round the wood or the marsh. A little before sun-rise, the air sometimes, as if awakened by the near approach of the sun, rises in a gentle breeze, and advances to salute him. This is occasioned by the greater warmth of the region which has already felt the influence of his rays. The ancient naturalists were misled by a reluctance to suppose that a change of temperature which they confessed had some share in the production of wind, was adequate to occasion those terrible effects which they beheld in a storm. But the progress we have made in discovery has taught us, that, if two solutions of any phenomenon are proposed, for which the arguments are equally balanced, we ought to prefer that which is most simple, and least imposing.

The goodness of the Creator manifested in the silent and beneficent effects of the wind, is acknowledged by the Roman moralist quoted above, whose words we will translate with as little paraphrase as possible:—"Therefore, among all the other works of Providence, this one also might be regarded as worthy of our admiration. For it was not for a solitary reason that he contrived the winds, or disposed them in different places: but, in the first instance, that he might not suffer the air to become inactive, but might render it useful by a constant agitation, and fit for the purposes of life to those who were destined to breathe it. Next, that he might supply the earth with rains, and restrain them at the same time from becoming excessive. For the winds not only draw the clouds together, but part them asunder, that the showers may be distributed over the whole globe. The corn could not be enjoyed, if the superfluous particles which are mingled with the essential had not been fanned by the breeze, if there were not something to awaken the standing corn, and expose the latent grain by bursting its integuments or coverings. What is that which has given to different nations the means of commercial intercourse, and has brought together tribes scattered in different places? The wind, which would be one of the vast benefits of nature, did not the madness of men turn it to their own injury."

### SCRIPTURE REFERENCES TO THE WIND.

The Hebrews acknowledged four principal winds, as we do, Ezek. xli. 16—18; Solomon says, in Prov. xxv. 23, That the north wind disperses the clouds, and the rain; but other interpreters translate it, "it produces rain."

The powerful operations and motions of God's Spirit, quickening or reviving the heart towards God, are compared to the blowing of the wind, John iii. 8. For as it is with the wind, man perceives, by the effects of it, that there is such a thing, and that it does blow, yet his power cannot restrain it, neither can his reason reach to know whence it rises, or from how far it comes, or how far it reaches; so is the spiritual change wrought in the soul; freely, where, in whom, when, and in what measure, the Spirit pleases; and also powerfully, so as to make an evident sensible change, though the manner thereof is incomprehensible.

Elsewhere the motions of the Spirit are set forth by wind; as in Canticles iv. 16.

The judgments of God are compared to wind; as in Isa. xxvii. 8. "He stayeth his rough wind in the day of his east wind;" He assuages the fury of the storm, and mitigates the severity of the judgment.

It is said in Isa. xxvi. 18, "We have been with child, we have, as it were, brought forth wind;" that is, We have been in expectation of help, and deliver ance out of our troubles, but our hopes have proved empty and unsuccessful, and we have not been able to do any thing towards our own deliverance.

So in Hos. xii. 1, "Ephraim feedeth on wind;" The ten tribes flatter themselves with vain deluding hopes of help from the Egyptians and Assyrians.

In Matt. vii. 25, all sorts of temptations are thus described: "The rains descended, the floods came, the winds blew."

And, in Jer. iv. 11, 12, the coming in of an army swiftly and fiercely, destroying all before them, is expressed "by a dry wind, a full wind."

The apostle Paul compares vain and inconstant opinions and doctrines to wind, Eph. iv. 14. "Carried about with every wind of doctrine." As the wind is a subtile body, so these doctrines are subtile, but without substance of truth. The wind is uncertain, now blowing from one quarter, now from another; now loud, and presently silent; so false doctrines are uncertain, now making a great noise, and suddenly vanishing. The wind likewise carrieth chaff, stubble, and such like things, along with it, but houses, well founded, stand still: so the doctrines of false teachers carry aside unstable persons; but he that is rooted in faith and humility, knowing his misery by sin, and the grace of God in Christ, will not be moved with them.

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## CHINA.

Dr. Wisner, of Boston, stated the following particulars in a speech he recently delivered:—

1. When was China Settled?—Probably as early after the flood, or even earlier, than the west of Asia; as multitudes came from the east, while the west was but thinly settled. And the Bible tells us, that the early inhabitants came from the east to Shinar. He also stated that there is some evidence that the ark rested on the mountains of China.

2. Extent.—China is the largest empire on the globe, excepting Russia. It embraces China Proper, Corea, Mantchoo Tartary, Mongolia, Little Bukaria, Thibet, and the adjacent islands; extending through forty degrees of latitude and seventy-seven degrees of longitude.

3. Government.—The reigning emperor is a Mantchoo Tartar. This branch of the Tartar race conquered China in 1644; since which time they have retained the rule. The government is absolute, and of the most despotic kind. It is the patriarchal system carried out to its fullest extent. The first of all duties is for children to obey their parents; and for the people to obey the emperor, the great parent of all. On the other hand, the power of parents over their children, and of the emperor over the people, is absolute, including that of life and death.

To show how deeply this principle is inwrought into the very structure of society, a tract was some time since condemned as heretical, because it taught that reverence is first due to God; which, they said, is contrary to reason and common sense. The emperor has power even over the gods; he may elevate or depress them in rank, and make or unmake them.

4. How can such a Government be carried on? it may be asked.—The emperor has ministers about him; and so on, by different grades, down to magistrates over ten families. Each magistrate has absolute power over all under him.

Punishments are frequent and severe. Capital punishments often take place; but the most common is the bastinado, which is very cruel. These punishments are inflicted at the will of the magistrate. To show their submission to chastisement, the victim, after he has received his bastinado, is obliged to kneel down before his punisher, and if he is able, bow three times, and thank him for his kindness in thus studying to promote his welfare.

5. Population.—The common estimate of the dense population of China is corroborated by Dr. Morrison, Mr. Bridgman, and others; and is believed not to fall short of 350,000,000. Nor is this unaccountable, since under the present dynasty of nearly two hundred years, no wars have prevailed. Travellers speak of the provinces as pouring forth their multitudes, not like the densely settled parts of Europe, but like the large cities, at the time of general festivals.

6. Language.—There are two kinds of language. First, the spoken, which is of various dialects, so different, that different tribes cannot understand each other. Second, the written language, which is one and the same; not only through China, but in Japan, Siam, &c. &c.; so that 400,000,000, or one half the people of the globe, and all who can read, can understand it. The Chinese characters do not stand for words, as in our language, but for ideas; similar to our Arabic figures, 1, 2, 3, &c. To these the English give one

name, the French another, the Germans another, the Arabians another; but all have the same idea when the figure is presented to the eye. Thus it is with the Chinese characters. Can any thing be more adapted in the providence of God for the spread of the gospel?

(To be continued.)

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## DANGER OF TRIFLING WITH CONVICTIONS.

Perhaps there is no minister of the gospel, who could not furnish some most affecting illustrations of the sentiment, that impressions and convictions do not always end in conversion. I began my own religious course with three companions, one of whom was materially serviceable, in some particulars, to myself; but he soon proved that his religion was nothing more than mere transient devotion. A second returned to his sin, "like a dog to his vomit, and a sow that is washed to her wallowing in the mire." The third, who was for some time my intimate friend, imbibed the principles of infidelity; and so great was his zeal for his new creed, that he sat up at night to copy out Paine's "Age of Reason." After a while he was seized with a dangerous disease; his conscience awoke; the convictions of his mind were agonizing; his remorse was horrible. He ordered all his infidel extracts, that had cost him so many nights to copy out, to be burnt before his face; and if not in words, yet in spirit—

> "Burn, burn," he cried, "in sacred rage,
> Hell is the due of ev'ry page."

His infidel companions and his infidel principles forsook him at once, and in the hearing of a pious friend who visited him, and to whom he confessed, with tears and lamentations, his backsliding, he uttered his confessions of sin, and his vows of repentance. He recovered;—but, painful to relate, it was only to relapse again, if not into infidelity, yet into an utter disregard to religion.—*James.*

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## IDOLATRY.

Dr. Wardlaw very justly observes:—The worship of idols, is "a lie" against God's Supreme Majesty. Their number is a lie against his unity: their corporeal nature is a lie against his pure invisible spirituality: their confined and local residence, a lie against his omnipresence and immensibility: their limited and subdivided departments of operation, against his universal proprietorship and dominion: their follies and weaknesses, a lie against his infinite wisdom: their defects, and vices, and crimes, a lie against his unsullied purity and perfection. In what a strange unhallowed state must that man's heart be, who contemplates without emotion this sacrilegious robbery of heaven—this universal slander upon the character of Deity! Yet there are some—would I could say with truth they are few in number!—who feel it very lightly. They can contemplate the whole scene with a careless smile; or, if their spirits are at all stirred in them, if their indignation is at all moved, it is against those officious, intrusive intermeddlers, that would disturb the idolaters by attempts to enlighten them. With an affectation of sentimental feeling, they fancy the universal Parent equally pleased with all descriptions of worship from his erring children, and impiously exclaim:

> "Father of all, in every age,
> In every clime adored,
> By saint, by savage, and by sage,
> Jehovah, Jove, or Lord."

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## NATURAL SOURCES OF WATER.

The laws by which the moisture, contained in the atmosphere, is precipitated from it in dews or rain, are not among the least admirable instances of the provision made by nature for a constant supply of the wants of man.

The mechanism, if the term be allowable, by which the formation of clouds and the occasional descent of rain are regulated, resides in the variableness of the state of the heat and electricity of the atmosphere; in consequence of which, a given mass of air is incapable of retaining, in solution or suspension, the same quantity of moisture which it did before; and hence that moisture is precipitated in the form of dews or fogs; or, being previously condensed into accumulated masses of clouds, is discharged from those clouds, in the form of rain.

It almost seems puerile to illustrate the adaptation of the present laws and order of nature to the wants of man, by the supposition of the consequences that would ensue from a failure of those laws; and yet, as in actual life, we often feel not the value of the good we possess, till admonished by the prospect of its loss; so, with reference to the constitution of nature, we may more forcibly be impressed with the conviction of its general harmony and subserviency to our wants, by the supposition of its being different from what it is, than by the direct contemplation of its actual state. In supposing, then, that means had not been provided for the regular discharge of portions of that mass of water which has been carried up into the atmosphere by the process of evaporation, the existence of that mass would have been of little avail to man; for mere contact of an atmosphere, however moist, could not promote vegetation to any useful extent;* and the formation of springs and rivers would be as effectually prevented by rain ceasing to fall from the atmosphere, as if the material of the rain itself did not exist in it.—*Professor Kidd.*

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### A BOLD SPEECH—BUT TRUE.

"I can do all things through Christ which strengtheneth me."

THIS seems a great speech for him who had once exclaimed, "O wretched man that I am! who shall deliver me from the body of this death?" Yet this text contains a true saying, and has a close connexion with that distressing cry. For though the believer's soul be often weak, and in conflict, we yet find him rejoicing in a Deliverer, mighty to save, even our Lord Jesus Christ. Behold, then, the Deliverer found! Behold him come with his very present help! Now, O believer, what canst thou do? "I can do all things," meekly answers the apostle, "through Christ which strengtheneth me."—*Hambleton.*

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### TURN TO THE BRIGHT SIDE.

IT is a most pernicious practice, in meditations on afflictions, to sit ruminating on the aggravation of the affliction, and reckoning up the evil, dark circumstances thereof, and dwelling long on the dark side; it doubles and trebles the affliction. And so when speaking of them to others, to make them as bad as we can, and use our eloquence to set forth our own troubles, is to be all the while making new trouble, and feeding and pampering the old; whereas the contrary practice would starve our affliction. If we dwelt on the bright side of things in our thoughts, and extenuated them all that we possibly could, when speaking of them, we should think little of them ourselves, and the afflictions would really, in a great measure, vanish away.—*President Edwards.*

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### SOLEMN APPEAL OF A CHRISTIAN MINISTER TO HIS CONGREGATION.

"IN the world there are two kingdoms: over one, Jesus Christ reigns supreme, and over the other, Satan, the prince of darkness, sways his sceptre; to be 'without' here signifies being out of the kingdom of Christ, and consequently in that of Satan. If there is one unconverted sinner in this congregation, to him would I address myself most particularly. Have you, my dear fellow-sinner, considered well what it is to be 'without,' and are you contented to remain 'without,' are you determined to remain 'without?' is there nothing in the Bible either to persuade or terrify you, and are you really resolved to stay 'without?' Oh, if you felt for your own soul any thing like what I feel for it, you would most eagerly inquire what you are to do to be saved. So earnestly did I determine, on entering the pulpit this sacred evening, to urge the necessity of your seeking the salvation of your soul, and so anxious am I that m endeavour should be successful, that my life would purchase it, I would ingly descend from this pulpit, an my head upon a block, and say to executioner, Sever my head from my body, if that will secure but one soul a mansion in the kingdom of God. But no; such a sacrifice could not be availing. There is One who shed his blood for sinners, whose life was worth ten thousand lives like mine, or that of any other mortal. He could and did lay down his life for his people; but all we can do is to be faithful instruments in the hands of God, to the salvation of the souls of sinners. I know not how to finish this part of my subject. O my dear fellow-sinners, as this may be the last time you may ever hear my voice in this place, let me entreat you to flee from the wrath to come; let me beseech you to pray for a participation in the atonement of Christ."—*J. Hyatt.*

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* Niebuhr asserts, what is confirmed by other travellers, that many tracts in Egypt and Palestine, formerly well cultivated and fertile, are at present mere deserts for want of irrigation.—(Descript. de l'Arabie, p. 241.)

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# WEEKLY VISITOR.

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OPENING THE BOOK OF RECORDS.

## SCRIPTURE ILLUSTRATIONS.—No. XVI.

Then they that feared the Lord spake often one to another: and the Lord hearkened, and heard it, and a book of remembrance was written before him for them that feared the Lord, and that thought upon his name.—Mal. iii. 16.

LIGHT is thrown upon this passage by a reference to the practice of chronicles, or books of record, being kept by Eastern princes, in which books were entered many matters of importance relative to the state. Thus, "When the adversaries of Judah and Benjamin heard that the children of the captivity builded the temple unto the Lord God of Israel," and set to work to oppose it; "Rehum, the chancellor, and Shimshai, the scribe, wrote a letter against Jerusalem, to Artaxerxes, the king" of Persia, in which they petitioned the king in these words:—"That search may be made in the book of the records of thy fathers: so shalt thou find in the book of the records, and know that this city is a rebellious city, and hurtful unto kings and provinces, and that they have moved sedition within the same, of old time: for which cause was this city destroyed." The king, in consequence, searched the book of the records, and found as they said, and prevented Jerusalem at that time from being recovered from its ruins. So we read in Esther, that Mordecai the jew had discovered a plot of two of the chamberlains of king Ahasuerus, to dethrone or destroy him, and having made it known to queen Esther, she immediately told it to the king. "And when inquisition was made of the matter, it was found out; therefore they were both hanged on a tree, and it was written in the book of the chronicles before the king." Some time elapsed, and no notice was further taken of Mordecai, except by the king's proud minister of state, Haman, who, mortified that Mordecai would not pay him the homage he received from the obsequious Persians around him, determined, in revenge, to destroy both him and his people. For this purpose he, as a favourite servant of the king, obtained a royal decree, which was on the eve of execution, when Providence remarkably interposed. One night, the king could not sleep, and he commanded to bring the book of records of the chronicles; and they were read before the king. It was found in reading them, that Mordecai had rendered the greatest service to the king in discovering the plot of his chamberlains, and, on further inquiry, that he had never been rewarded. This led to the elevation of Mordecai, the downfal of Haman, the preservation of the Jews, and the destruction of their principal enemies.

These little scripture narratives at once illustrate the expression of "the book of remembrance" kept before the Lord, "for them that feared the Lord, and thought upon his name." Such there were during the most wicked state of the Jews, just prior to the destruction of Jerusalem, and the gracious eye of God was upon them. As the scribe of an earthly prince would record all the actions of distinguished subjects, so every one that feared and reverenced God was carefully noticed by him, and would be safe in the day of approaching calamity. "They shall be mine, saith the Lord of hosts, in the day when I make up my jewels; and I will spare them, as a man spareth his own son that serveth him." We may stretch our thoughts still further, to that awful day of which the destruction of Jerusalem may be considered as a faint type, and then, when the wicked shall be consumed in the flames of Divine wrath, the great King of kings shall see, infinitely more clearly than ever monarch saw the register of his subjects' deeds, all the evidences of his people's characters, and great shall be the reward which his grace shall bestow upon them in glory. C.

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## CHEMISTRY. No. VI.

### CARBON, SULPHUR, AND PHOSPHORUS.

Charcoal is a well-known substance, easily procured by burning wood under sand at a red heat. It is a light, hard, sonorous, brittle substance, without smell; and is capable of resisting the most intense heat that can be applied to it, provided that air be excluded, or, in other words, if oxygen gas be not present. It possesses the useful property of being incapable of decay from age, for instances are upon record of its having possessed its original characteristics after the lapse of a thousand years.

The elementary principle of this substance is carbon; a principle that exists abundantly in nature. The diamond is a pure carbon, charcoal consists of carbon and oxygen. Diamond is a crystallized carbon, and cannot be scratched by the hardest steel; it is, in fact, the hardest substance in nature. When we compare the appearance of charcoal with that of the diamond, we are forcibly impressed with the extraordinary difference of visible impression produced by two substances nearly analogous; for there is but a shade of difference in their composition. The one body is so constituted, that its particles are more firmly united together than in the other, and also somewhat more homogeneous in its composition: but, although no greater difference can be discovered between them, yet because of the commonness of the one, it is, to the man who knows not its value in scientific investigations, almost worthless; while a diamond, weighing only one ounce and one eighth, has been estimated at the enormous price of 126,000*l.* If it were not difficult, on account of their value, to obtain diamonds, it would be easy for the student to prove by experiment that they are of the same nature as charcoal; for if raised to an intense temperature, both substances form, by union with the oxygen they absorb, the same gaseous body, carbonic acid gas. Charcoal takes fire at 370° Fahrenheit, and if kindled in oxygen gas, it is gradually consumed with a most brilliant flame; but the diamond will not ignite at a heat less than 5000° Fahrenheit. Charcoal possesses the property of slowly absorbing gases in very large quantities, and it has been stated that it will in some cases take up ninety times its own volume; but if it be afterwards immersed in water that is at a boiling temperature, the gas will be abstracted. It is often used for, and is a useful agent in the removal of taints of putridity from meats and utensils. It is one of the ingredients of gunpowder: it is used for the deoxidization of metals; that is to say, for attracting from them the oxygen they may have collected, so as to render them pure: it is the chief ingredient in bitumen and pit coal: it is the base of vegetable substances, and of a great variety of bodies in the animal and vegetable kingdoms: it enters largely into the composition of sugar, oils, gums, and resins, and frequently combines with oxygen and other substances. These statements are sufficient to prove that carbon is an important principle to the chemist, in manufactories.

Sulphur is a substance so generally known, that it requires but a brief description. It is found in greater purity, than any other principle with which we are acquainted. It is generally found in the neighbourhood of volcanoes, and is usually in a crystallized state. Sulphur is a brittle and combustible body, of a pale yellowish colour; it burns with a blue hue; melts at 184° Fahrenheit, is volatilized, or passes into a gaseous form at 289°; and takes fire at 302°. Its specific gravity is about 2°. It is of great use in medicines, and in the arts, and forms some most important combinations with the metals, the earths, and oxygen.

Phosphorus is more rarely found than either of the afore-mentioned substances. It may be produced from both animal and mineral compounds; but is usually made from the bones of animals. It burns at a very low temperature, 148°Fahrenheit, and may be melted at a temperature of 90°. If a small portion of phosphorus be dropped into a Florence flask, nearly filled with water, and a sufficient heat be produced to raise the temperature of the water to the boiling point, balls of fire will be seen to ascend towards the top of the flask. This experiment proves the extreme inflammability of the substance. This statement is also proved by the fact, that phosphorus has a slow combustion at common temperatures, and consequently always appears luminous in the dark. As this substance is frequently used by youth for the sake of sport, it may be necessary to caution them to use it with much care, or the most disastrous effects may be produced.

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## CHINA.

(Concluded from page 127.)

7. Religion.—There are three systems of religion prevalent in China,—Confucianism, Tahooism, and Boodhism.

Confucius lived about five hundred and fifty years before Christ. His religion, something like the rationalism of the present day, states that what a man believes is of little consequence, provided he leads a moral life. His precepts are many of them good, so far as they extend; but are radically defective in principle. His instructions had reference chiefly to social intercourse. His system was calculated only for the learned and contemplative, and hence had no influence over the common people. To remedy this evil, Tahoo introduced his system, but went into speculations respecting the nature and relations of gods; so that his system was not embraced by the common people.

Boodhism was next introduced, from Ceylon. Boodh was originally a mortal man. The fabulous account given of him is, that after various transmigrations, some of which were into the meaner animals, on account of his sins, and after having suffered in hell 80,000 years, he resolved to reform and become a god. He was then born the son of a Hindoo king, and raised himself by austerities to his present dignity. The highest aim of Boodhism is insensibility. The doctrine of the Boodhists is, that there are periods of the revolutions of things, each of which occupies millions of ages, and they are now living in one of those cycles.

Over the various countries of the east, Boodh is the principal object of worship. In China, he is Boodh; in Thibet, the Grand Lama, &c. When this cycle has passed, he will be absorbed in the supreme divinity, and another god will take his place. This religion is said to have more devotees than any other. They may worship as many other gods as they please, or believe as they please, if they only believe in Boodh. Of the introduction of Boodhism into China, the Chinese writers give the following account. In the year 65, or about thirty years after the crucifixion, the emperor was informed in a dream that the holy one was born in the west. The ministers of religion recollected that something was said in the sacred odes of the rise of such a personage. They concluded, therefore, that the period had arrived when he was to appear. The emperor despatched ambassadors to the west, to bring some disciple of the new-born sage. They proceeded as far as Ceylon, and brought thence some priests of Boodh; when, being friendly, the government rapidly propagated their system, which soon became the popular religion of the country.

8. Introduction of Christianity.—Christianity was introduced into China by the Nestorians, in the seventh century; and was continued for three or four centuries. What now remains of it we cannot at present know. The roman catholics entered China about 1550. When this religion was declining in Europe, the Jesuits were making great efforts in the east. They met with great success. By means of pictures, and imposing ceremonies, and by their knowledge of astronomy, and by allowing the Chinese to retain their customs and practices, if they would only profess the Catholic religion and be baptized, they converted great numbers. It was at length suspected they were meddling with the affairs of government: persecutions arose, and they were driven from China. As the character of their converts was not changed, of course they soon fell back to idolatry.

9. Protestant Missions.—Dr. Morrison, the first protestant missionary, entered China in 1807, and was for a while

associated with Dr. Milne. The labours of Dr. Morrison, in translating the whole Bible into Chinese, are well known. The Rev. Mr. Bridgman, of the American Board, arrived in 1830.

Dr. Wisner then enumerated the American and English Missionaries now in or near China, and on their way thither. Gutzlaff has proved, he said, that China may be entered; that access may be had to the Chinese. Here he has been labouring since 1831. The Bible and tracts are now distributed in great numbers. Converts have been made, particularly Leang Afa, the first Chinese convert, who was a printer by trade. It has also recently been ascertained, that Chinese blocks can be stereotyped.

10. PROVIDENCE RESPECTING CHINA.—Several years since, the enterprise was commenced by the Bible and Tract Societies of sending Bibles and Tracts to foreign countries. The design was well received and responded to by the churches. About three or four years ago, Gutzlaff resolved to enter China. The result is well known.

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## SIMPLE MACHINES—THE LEVER.

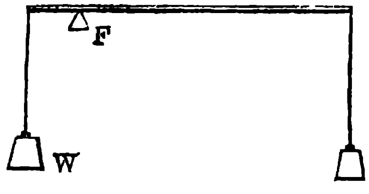
WHENEVER a machine is used, it is intended to accomplish one or more of the three following purposes:—1. To direct the force which is put into action by the moving power. 2. To change the velocity of a force, and to produce one suited to the object required: or, 3. To assist or regulate the intensity of a force, and to enable it to perform just that which is required.

All machines, however complicated they may be, consist of a number of simple machines, such as levers, wheels, and axles, pulleys, inclined planes, wedges or screws. These are the elements of all machinery, and the principles and action of any mechanical arrangement may be discovered, with a little attention, if the principles of these be perfectly understood. They are sometimes very erroneously called the mechanical powers, for they possess no actual power, but merely offer a means by which a power may be directed in such a way as to produce the greatest possible result, by directing the force, changing the velocity, and regulating its intensity. Some writers have treated of the simple machines under three classes, the lever, the pulley, and the inclined plane; and, strictly speaking, the wheel and axle can only be considered as a modification of the lever; and the wedge and the screw are but varieties of the inclined plane; but that we may render our description of their action as simple as possible, we shall treat of them separately.

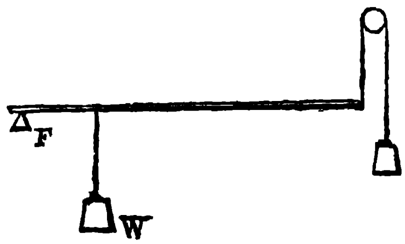
The lever is a bar of some inflexible material, resting on a point called its fulcrum, the power and the resisting body being differently arranged according to circumstances.

There are three kinds of lever.

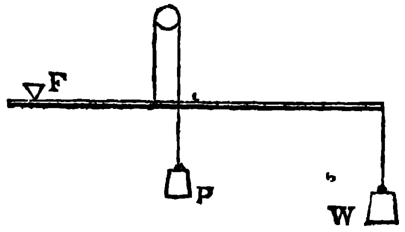
1. That in which the fulcrum is placed between the weight and the power, as in the above figure.* The common balance is a lever of this kind, but as both its arms are equal, and the fulcrum is in the centre, no increase of power is gained. The Roman steelyard, the handspike, and the crowbar, are also levers of the first class.



2. The second class is that in which the weight is between the fulcrum and the power. A door is an example of this class: the hand applied to it is the power, the hinges the fulcrum, and the door itself the weight. But an oar is a still better illustration: the rower is the power, the water the fulcrum, and the boat on which the oar rests is the weight to be moved.



3. The third class of levers is that in which the power is between the weight and the fulcrum. The limbs of animals are levers of this class; the socket of the bone



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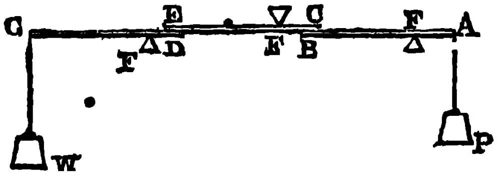
* F means fulcrum, W the weight, and P the power.

is the fulcrum, the muscle attached to the bone near the socket is the power, and the limb is the weight.

The condition of equilibrium in the straight lever is, that the power multiplied by its distance from the fulcrum, shall be equal to the weight multiplied by its distance from the fulcrum. Let the weight, for instance, be 1,200lbs., and its distance from the fulcrum be one foot, and let the power be 200lbs at a distance of six feet, and the lever would be in equilibrio, for by multiplying together the weight and its distance, it will be found that their product is equal to the product of the power multiplied by its distance. The immense value of the lever in appropriating power in the most advantageous manner will be immediately perceived from a consideration of this law. Suppose that we have a great weight to raise with a small force, it is only necessary to remove the power so far distant from the fulcrum that it may compensate for the great superiority of the weight which we shall bring as near to the fulcrum as possible. We might, therefore, raise an enormous weight with a very small force, provided that the cohesion of the substance employed as a lever were sufficiently great to oppose the strain to which it would be subject.

It will be hardly necessary to remark, that in the lever of the first order, the weight and the power act in the same direction; in the levers of the second and third orders they act in opposite directions; and it is equally evident that in a lever of the second order the power must be less than the weight, because it is more distant from the fulcrum, while in a lever of the third order it must be greater than the weight, because it is nearer the fulcrum.

Compound levers, or in other words, systems of levers, are sometimes employed in machinery, and the power then acts upon the weight through the intervention of a series. In the annexed figure we have a system of levers, consisting of three; all of which belong to the first order. W is the weight attached to the end of the first lever, and P the power attached to the opposite end of the last. Now the power transmitted to B, exerts a certain pressure on the second lever, at C, which in its turn communicates a pressure on the third lever at D, and that supports or raises the weight W. To calculate the power of this or any other compound lever, multiply the power by the continued product of the alternating arms, commencing from the power, and when the lever is in equilibrio it will be equal to the weight multiplied by the continued product of the alternating arms, commencing from the weight. Thus, let us suppose the alternating arms to be as 1, 2, and 3, and the weight to be 64; these multiplied into each other will be equal to 384, and let us suppose the arms nearest the power to be as 4, 6, and 8, which multiplied into each other are equal to 192, then a power of 2 would balance the weight, because 192 multiplied by 2 are equal to 384, the product of the weight multiplied into its alternate arms. The same rule will apply to all other systems of levers to whatever order they may belong.



(To be continued.)

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GIFTS TO KINGS.

There was a law much observed among the Persians, that when the king rode near the residence of his subjects, each one according to his means should set something before the king; husbandmen who were occupied in the tillage of the earth, or handicraftsmen, brought what was neither contemptible on one hand, nor costly on the other, but oxen, or sheep, or corn, and others wine. As the king walked or rode by, these things were set forth by every one, and were called gifts, and accepted by him. Others who were more needy than these offered milk, or palms, or cheese, and even sweetmeats, and the first-fruit of their lands or gardens. These were esteemed as a symbolical acknowledgment of the allegiance due on the part of the subject to his sovereign.

In Psalm xlv. 12, it is said, that the daughter of Tyre shall be there with a gift, or as the hebrew means, *an act of homage;* in token of submission. In Hosea x. 6, the calf of Bethaven is threatened with being carried as a present or gift to the Assyrian king, as a formal declaration of subjection to his authority. In Lev. ii. 1, the same hebrew word occurs, and is rendered *meat.*

## THE DOUBTFUL AND THE CERTAIN.

It is much better for a christian ardently and steadily to pursue the certain advantages set before him in the gospel, than to lose time in the vain endeavour to clear up those doubtful points on which godly-minded men have entertained different opinions. Sober-mindedness in reading God's holy word is of great value.

"We cannot," says an eminent servant of God, "sink too low in humility, nor yet rise too high in heavenly-mindedness; but we may soon be lost in the wilderness of needless speculations. Such as are sober-minded will keep well within their depth, and when the Lord directs us to launch forth, we may do it with safety. If we are wise according as it is written, we shall be profitably wise; but if we want to be wise beyond what is written, we shall smart for our folly."

How many a disciple of the Redeemer has robbed himself of comfort and peace by leaving the sure and certain hope of eternal life in Christ Jesus, to enter into the controversies of the professing world, about the doubtful points of less important subjects!

Surely this is tending swine for a stranger, when we might live at ease in our father's dwelling! This is feeding on husks, when the fatted calf is prepared for our repast! The words of Bishop Hall, in reference to the reign of a thousand years by the Redeemer, are well worthy to be remembered:—

"O blessed Saviour, what strange variety of conceits do I find concerning thy thousand years' reign. What riddles are there in that prophecy which no human tongue can read! Where to fix the beginning of that marvellous millenary, and where the end; and what manner of reign it shall be, whether temporal or spiritual, on earth or in heaven, undergoes as many constructions as there are pens that have undertaken it; and yet, when all is done, I see thine apostle speak only of the souls of the martyrs reigning so long with thee, not of thy reigning so long on earth with those martyrs. How busy are the tongues of men, how are their brains taken up with the indeterminable construction of this enigmatical truth, when, in the mean time, the care of thy spiritual reign in their hearts is neglected! O my Saviour, while others weary themselves with the disquisition of thy personal reign here upon earth for a thousand years, let it be the whole bent and study of my soul to make sure of my personal reign with thee in heaven to all eternity."

## ETERNITY.

"Ever," a little word, but of immense signification! a child may speak it; but neither man nor angel can understand it. Oh, who can take the dimensions of eternity? The whole space between the creation of the world, and the dissolution of it, would not make a day in eternity; yea, so many years as there be days in that space, would not fill up an hour in eternity. Eternity is one entire circle, beginning and ending in itself. This present world, which is measured out by such divisions and distinctions of time is therefore mortal, and will have an end, 2 Cor. iv. 18.

If eternity did consist of finite times, though ever so large and vast, it would not be eternity, but a longer tract of time only; that which is made up of finite is finite. Eternity is but one immense, indivisible point, wherein there is neither first nor last, beginning nor ending, succession nor alteration, but is like God himself, one and the same for ever.—*Case.*

## MEDICAL PROPERTIES OF CAPRIFOLIACEOUS PLANTS AND SHRUBS.

As the members of this order receive their general name from caprifolium, by which the garden or Italian honey-suckle was long known, it would seem like a piece of good manners to commence with a species of the same genus, (*Lonicera,*) which shall be our own most lovely woodbine, or honey-suckle. It is reputed to be of great service in coughs and asthmatic disorders, whence it is said to be heating and drying. These qualities are due, perhaps, to its purgative properties, by which moisture is removed, instead of being dried up, according to the notion of older herbalists and lovers of simples. Dioscorides ascribes the same drying properties to another species, probably the *Lonicera Xylosteum,* which is found in Greece. He further states that it abates the sense of fatigue and weariness after much exertion, an effect which may be attributed to a gentle purgative quality that it possesses. For after long continued bodily effort, when the powers of nature are brought low, the consequences that result from it may often be checked, if not prevented, by "taking a little medicine." The maxim that we have often heard, namely, that hard labour requires good eating, must be accepted with many grains of allowance, and can only apply where labour is not followed by lassitude. In treating of the medical properties of certain related plants, we labour under considerable disadvantages, for in very few instances have we a sufficient number of trials on record to afford all the certainty that is to be desired, especially when we are anxious to show that a certain similarity of property accompanies a correspondence of structure. Under this point of view their medical qualities become matters of science, which are equally interesting, whether we may or may not have recourse to them. Several species of the *lonicera*, or honey suckle, are found in California. Most persons are aware that honey is secreted in the tube of the honeysuckle, but it may not be wholly uninteresting to state, that one of the species found in California, was observed to have a distinct organ for the office of secretion in the shape of a little bag at the base of the flower.

*Sambucus nigra*, Common Black Elder. —The leaves, boiled like pot herbs, purge phlegm and bile, as Dioscorides asserts; and it appears from modern trials that the inner bark of the stalk, when recent, is very powerful in evacuating the primæ viæ, or principal passages of the body. Sydenham directs that three handfuls of the recent bark should be taken and boiled in a quart of milk and water, till only a pint remains, of which one half is to be taken night and morning, and repeated for several days; it operates both as an emetic and cathartic. Upon these evacuations its utility depends. Among those who enjoy an average state of good health, with an occasional interruption from what some people call "bile," or a disordered stomach, the adoption of Sydenham's advice would prove a cheap and easy course of physic, without the apprehension of any untoward consesequences. The flowers, when distilled in large quantities with water, yield a small portion of butyraceous (buttery) essential oil. Infusions of the fresh flowers are gently laxative and aperient: when dry, they are said to promote the cuticular excretion, or that discharge which passes through the pores of the skin, and to be peculiarly serviceable in erysipelatous and eruptive disorders. In cases, therefore, of St. Anthony's fire, and other derangements of the skin, a tea made of the dried flowers would be found to have a good effect, and might always be administered with perfect safety. A mixture of this tea and spirits of wine has been recommended as a fomentation in the erysipelas. The purple juice of the berries proves a useful aperient and resolvent in recent colds, and in sundry chronical diseases, gently loosening the bowels and promoting perspiration. This juice might be most conveniently preserved by the lover of domestic good, in the simple form of a jelly, and would, without doubt, be found to be a very grateful and effectual remedy for subduing the obstinacy of a cold. If turnips and cabbages, and even fruit-trees, be whipped with the green leaves and branches of the elder, the insects will not attack them.

*Sambucus Ebulus*, or Dwarf Elder, or Danewort, which is found by the road sides and in neglected churchyards, has, in the estimation of Dioscorides, the same qualities as the preceding, which is confirmed by modern experience. It is easily recognised by its resemblance to the black or common elder; and the colour of its anthers, which are of a deep red or blood. The stem of a specimen which we observed growing near a churchyard at Wingfield, in Suffolk, was dyed with the same colour.

The seeds of the *Ebulus* yield an oil, which Haller applied with success in painful affections of the joints. The leaves boiled in wine, and formed into a cataplasm or poultice, have been recommended in France as a discutient application for bruises and tumours. The root was formerly much employed in dropsies, which shows that our forefathers esteemed it as a powerful diuretic. The odour of the green leaves drives away mice. The Silesians strew it as a bed for their swine, deeming it as a charm to keep away diseases.

*Viburnum Opulus*, Guelder tree. — A name which seems to be a corruption of water elder-tree, since it prefers the banks of ditches and damp places. The inner bark is recommended in dropsical cases. The young shoots and buds, used as a pickle, are said to have the same effect in a lesser degree. But a wine made of the juice of its berries, mixed with white wine, is reported to produce the same result with increased activity. The flowers are sudorific and anodyne, that is, when an infusion or tea is made of them, it promotes perspiration and allays pain.

*Viburnum Lantana*, Wayfaring-tree, or pliant mealy-tree. This term mealy is applied to it in consequence of the hoary and downy nature of its long pliant branches. The berries are said to have an astringent and drying quality, which may be imputed to their tendency to remove offending matters which disorder the bowels. They are recommended also in glandular swellings about the mouth. We see by these few examples that there is a correspondence of medical properties between those plants which botanists have grouped together, and that the common points of union are not merely matters of artifice and curiosity. If, for instance, we landed on an island, and found a plant which recommended itself to the eye as good for food, and upon trial it proved grateful to the taste, a reference to its Natural Order would inform us whether it might be eaten with safety or not. In ships of discovery it often happens that the seamen pick up some plant when they come ashore on some new island: the herb tastes like a good salad, but they doubt its wholesomeness. If they refer their doubts to the naturalist, he is able, from a botanical examination, to satisfy their doubts, though he may have never seen the plant before.

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## "VANITY OF VANITIES."

An affecting illustration of the truth of Solomon's remark, is furnished in the history of Combe, the unhappy author of "Dr. Syntax in search of the Picturesque." "We find," says a reviewer, in the "Companion to the Library," this improvident man, and all within a few years, figuring as a boy at Eton, a scholar at Oxford, a student in the Temple, with a very handsome independent fortune; a barrister pleading with success; a man of fashion intimately associating with lords and ladies, and calling himself, (from his courtly dress and splendid liveries,) "The Duke;" and then an outcast spendthrift; a private soldier; a novice in a French Monastery, playing the Monk, to get his bread for the time being; a strolling player; a gentleman's servant; and a waiter at an inn at Swansea. It was after all these metamorphoses that he turned himself into an author. His last scene of all was the King's Bench; there he wrote "Syntax," and some other works; and there he died, not very long ago, after an imprisonment (for debt) of twenty years."

We learn from this history, that talents without religious principle often will prove a snare, and often lead to misery.

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## DIMINISHED MORTALITY IN TOWNS.

The following table, illustrative of the increased longevity of the inhabitants of the principal towns, is copied from the Edinburgh "New Philosophical Journal."

The mortality of the undermentioned places is as follows:—

| | In the Year | Inhab. | In the Year | Inhab. |
|---|---|---|---|---|
| Paris . . . | 1650 | 1 in 25, | 1829 | 1 in 32 |
| London . . | 1690 | 1 in 24, | 1828 | 1 in 55 |
| Berlin . . | 1755 | 1 in 28, | 1827 | 1 in 34 |
| Geneva . . | 1560 | 1 in 18, | 1821 | 1 in 43 |
| Vienna . . | 1750 | 1 in 20, | 1829 | 1 in 25 |
| Rome . . | 1771 | 1 in 21, | 1828 | 1 in 31 |
| Amsterdam . | 1770 | 1 in 25, | 1829 | 1 in 29 |
| Cambridge . | 1811 | 1 in 41, | 1821 | 1 in 58 |
| Norfolk . . | 1811 | 1 in 50, | 1821 | 1 in 59 |
| Manchester . | 1757 | 1 in 25, | 1821 | 1 in 58 |
| Birmingham . | 1811 | 1 in 30½, | 1821 | 1 in 43 |
| Liverpool . | 1773 | 1 in 27, | 1821 | 1 in 41 |
| Portsmouth . | 1800 | 1 in 28, | 1811 | 1 in 38 |
| Petersburgh . | 1768 | 1 in 28, | 1828 | 1 in 48 |
| Stockholm . | 1763 | 1 in 19, | 1827 | 1 in 26 |
| Total Deaths . . | 15 | 409½ | . . 15 | 620 |

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## MANKIND.

What the condition of mankind would have been, apart from the peculiar ground on which they are placed by the intervention of the work of Christ, is a speculation on which we need not indulge. Our great business should be, to avail ourselves of the best means of providing against the evils which actually press upon us, and not to waste our time or capacity in imagining circumstances that were not to exist, or in conceiving of remedies and means of alleviation that were never to be needed. It would seem, however, to be unquestionable, that if our condemnation be a proceeding of strict equity, our redemption must be a matter of pure favour. If we have deserved to find our home in the abodes of darkness, we cannot have been entitled to a place in the realms of light. This may sound very like a truism, yet how much is in it!

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Prayer.—He who prays as he ought, will endeavour to live as he prays, Prov. xv. 8. He that can live in sin, and abide in the ordinary duties of prayer, never prays as he ought. A truly gracious praying frame is utterly inconsistent with the love of, or reserve for any sin, Ps. lxvi. 18. —*Owen.*

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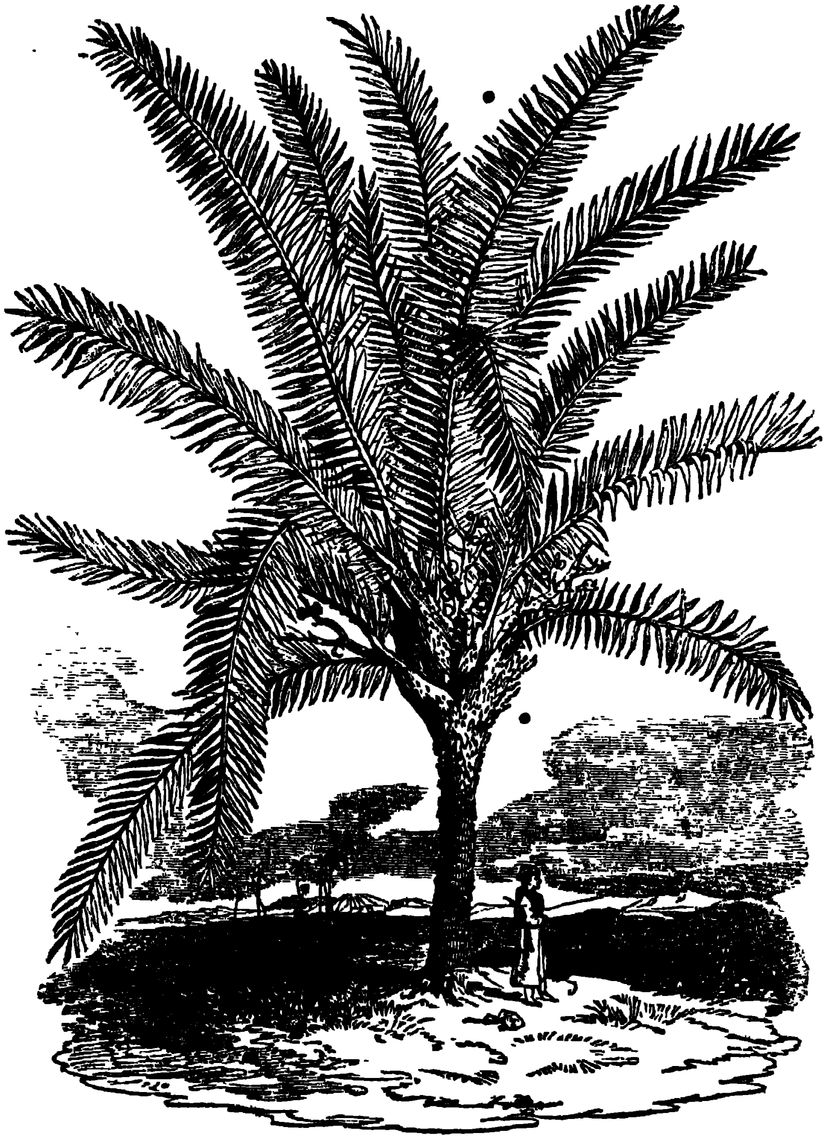

SAGUS GENUINA, OR SAGO PLANT.

THE sagus belongs to the natural order of palms, having a calyx of six leaves, and as many stamens with dilated filaments in the barren flowers. The fertile and barren flowers are sometimes united in one. Characters derived from the calyx and stamens are often ambiguous, and, therefore, in discriminating the different kinds of genera of palms, we look chiefly at the fruit, which in the sagus is a nut, with scales imbricated backwards.

Scales are imbricated when they are placed one over the other, like flat tiles upon the roof of a building, or like feathers upon the breast of a bird, which by hawkers were called the mail-feathers, inasmuch as they resembled, by their position, plates laid upon a breast-plate or coat of armour. This fruit is pictured above, with the scales pointing towards the base, which is denoted by a pair of calyx leaves on which it is resting. At the top is seen a small point, which is the relic of the style. In this fruit we have a testimony to the unsparing goodness of God, who, to a tree of such extensive usefulness, has annexed these marks of beauty and recognition, by which the eye is delighted, and the judgment directed. The mailed nut, of which we have been speaking, is about the size of a pigeon's egg, and contains only one seed.

(Fruit of Sago Palm.)

The sago palm supplies a universal article of food to the inhabitants of Amboyna, Ceram, Celebes, and the surrounding islands east of the Celebes, as well as those of Borneo. This tree propagates itself by offsets, or shoots from the roots, which for a long time appear only like bushes at the bottom of the full-grown trunk. The stem, when it begins to form itself out of the bush just mentioned, shoots up as straight as an arrow, to the height of 40 or 50 feet, forming a handsome tuft at the top, which gives an agreeable shade. These trees, when arrived at maturity, consist of nothing but a spongy substance. This spongy or cellular substance is penetrated by a number of tubes, or at least what have the appearance of tubes, which become like tough threads in time, and consequently separated from the spongy nutritive substance of the cells. A grove of these trees presents a very charming appearance, and affords a most delicious retreat from the mid-day sun. They flourish in wet, morassy situations, where abundance of nutriment is at hand to supply their prodigious wants. A tree is chosen, the pith of which has arrived at full maturity, which is ascertained by a yellowish white cast that is then seen just below the foliage. The stem is then cut through as close to the ground as possible, that none of its farinaceous materials may be lost. The inhabitants sometimes resort to the experiment of cutting a hole in the tree, out of which they take some of the pith for examination. If it proves unripe, they either close the hole, or fell the tree immediately. When the tree has been thus felled, it is cut into two or three pieces, and the hard bark is split asunder by the application of wedges. The sago is thus laid bare and scooped (poekeled) out with an instrument resembling an adze.

The raw sago, after having been reduced to the appearance of saw-dust, is put by portions into a trough, like a canoe, and water is poured upon it, and well mixed with the sago, by which means the meal is disengaged from the filaments, or thready parts. These filaments are called *ela*, and are used to feed pigs, poultry, &c. The water thus impregnated with the sago-meal, after standing still for some time, till the meal has subsided by its own weight, is poured off, and replaced by a fresh quantity for further purification. After this the wet meal is laid upon flat wicker baskets to dry, and is then kneaded together, and formed into little cakes of three inches long, two inches broad, and half an inch thick. These cakes are lastly put into moulds of a corresponding size, and baked over the fire.

God, who is rich in bounty, is also rich in means, and has therefore lodged the nutritious farina or meal in the sago and manioc, as well as in the wheat and the rice. However varied his works may be, they all agree in ministering to the wants, the enjoyments, and the instruction of mankind. The sago vies with the wheat in utility, and the plantations of that stately palm, where all is freshness and luxuriance, surpass in goodliness the waving corn-fields of old England, when the ripened honours of yellow autumn invite us to joy and thankfulness.

The dried fruit and scaly fruit branches of this tree may be sometimes seen in the collections of the curious, and then the tiles upon the former are pressed close, and present a surface embrowned with a lovely chestnut colour, and smoothed with a beautiful polish. We saw but a day or two before these observations were written, a dried fruit branch of another species of this genus, the sagus ruffia, which was eight or nine feet in length, and beautifully clustered with these polished nuts. If the inquisitive reader should at any time be shown a brown, shining, and hard nut, with various risings upon it, he will not guess wrong if he should take it to be the fruit of one or other of these palms.

There is one circumstance connected with its history, which deserves to be recorded, for it intimates the care and goodness of Providence not only in providing, but also in guarding things for the use of man. While the tree is young and tender, the leaf-stalks are furnished with sharp thorns, which Rumphius, who first described these palms, compares again and again to sewing needles. The use and final cause of this defence might not suggest itself at first to the observer; but when he recollected that hogs or wild boars are very numerous in the places where it is found, and that they are very fond of the young plants, he would soon infer that these fierce points, which often inflict great pain upon the unheeding passenger, were beneficial to mankind, for without them the sago could never be enjoyed. The writer remembers a palm which is very common in the woods near St. Blas, Mexico, which is provided with thorns, doubtless for purposes of self-defence, as it is remarkable for the shortness of its trunk; the flowers and fruit, ere they are ripe, would therefore fall a prey to every hungry or wanton invader among the beasts of the field, from which they are preserved by this simple provision that nature has made for their safety. Though it has pleased God, in this and in other instances, to give pre-eminence to man, yet as his mercy is over all his works, "he giveth fodder to the cattle," as well as "herb for the use of man." For the lower animals, which depend upon man for their supplies, share with him in the participation of the full-grown tree, as hinted above, when we spoke of the *ela*, and in a far larger measure than if they had been suffered to eat it at first without the interference of their competitor.

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## OLD HUMPHREY ON DEPARTED FRIENDS.

SHAME upon us! Shame upon us! when our friends are taken away from this world of tribulation, we think more of their perishing bodies than we do of their immortal souls. We go amid the gloom of eventide to sigh over their graves, rather than take the wings of the morning to visit their enfranchised spirits in the mansions of the blest! Shame upon us! Shame upon us!

It is a hard thing, to be sure, to part with those who have been almost as dear to us as our own souls, and no one but the God of all consolation can make it easy to us; but when we think of the glorious things He has prepared in heaven for his people, our tears for those who die in Christ should be those of thankfulness, and our sorrow should be turned into joy.

To a christian, death appears the portal to eternal life, and therefore he ought to rejoice when a fellow-pilgrim to the heavenly city is mercifully permitted to pass through it; but it is otherwise with the worldly man; the grave must needs be a fearful thing to him who has no hope beyond it. It has often been a puzzle to my mind, how worldly men bear up under the loss of their friends. Is it not enough to touch our hearts, to see those who have been precious to us as the "ruddy drops that warm the heart," stretched on a bed of sickness, unconscious of our presence and sympathy? To hear the hard-drawn breath, and midnight moan; to mark the glazed eye, the heaving breast, and the falling jaw, while the last breath rattles in the throat?

Are not these things, and the shroud, the coffin, and the grave, enough to try humanity to the utmost, without the intolerable burden, the soul-sickening persuasion, that we have parted with our friends for ever?

Surely [illegible] cere mourner has to drink is bitter enough, without the gall and the wormwood of an eternal separation. Blessed be God, for his gracious promises of an eternal world, for they are as unchangeable as eternity itself!

What poor creatures we are! Here have I received tidings that a highly respected, and dearly beloved friend, has been removed from the gloom of earth, to the glory of heaven, and yet I cannot rejoice. My selfish heart will brood over what it has lost, and will not exult over what my friend has gained. In our day we had shared both joy and sorrow. We had taken "sweet counsel together, and walked to the house of God in company." We had encouraged each other to endure worldly trouble patiently, and to rejoice in the hope set before us of eternal glory; and yet for all these things I cannot help visiting his resting-place in sorrow.

But the spirit is not there! It is a better employment, and more likely to be successful, to prepare to follow them to the heaven of heavens, than to wish to drag them once more down to this poor perishable world. I am ashamed of myself, for every now and then, a tear rolls down my cheek, and tells me that my earthly affections are opposing my heavenly desires and consolations.

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## INSECTS.—No. XXXVI.

### (*Hearing.*)

BEFORE proceeding immediately to the prescribed topic of this paper, it may be well to remark, that men of science are scarcely yet agreed as to the senses of insects, and that the use of some of their organs, which appear to be organs of sensation, has not yet been satisfactorily ascertained. As to the senses in general, it need scarcely be stated that touch, taste, smell, hearing, and sight, is the ordinary enumeration of them; but as the term includes every means of communication with the external world, the list might, perhaps, be increased. Kirby contends, for instance, for an internal sense. He says, "The picture may be painted upon the retina of the eye, and the sound may strike on the tympanum of the ear; but neither the one nor the other be received by the intellect, unless the internal power or faculty of perception be in action, and mediate between them. This is what I mean by the internal sense, which, to use a term of Mr. W. S. MacLeay's, is osculant between intellect and sense, or forms the transit from one group of powers to the other."

In man the ordinary five senses are usually in their greatest perfection, although in some animals particular senses have a greater range. The vertebrates in general are also gifted with the same number, though there are some exceptions. But in the invertebrates they are seldom to be met with altogether in the same object. Some creatures have no smell; several can neither hear nor see. The animals of bivalve shells have neither eyes, nor ears, nor smell; and the zoophytes, and the races below them, have, it is affirmed, only the single sense of touch, which in them is so extremely delicate as to be acted upon even by light.

Not so are insects. These, there is good reason to believe, possess all the ordinary senses. Linne and Bonnet, however, thought them deprived of hearing; but numerous observations prove the contrary. That they hear in their larva state, is evident from facts stated by the latter. He found that the sound of his voice evidently affected some caterpillars; which he attributes, but surely without reason, to the delicacy of their sense of touch; at another time, when some caterpillars of a different species were moving swiftly, he rang a small bell, on which they instantly stopped, and moved the anterior part of their body very briskly. That they possess this power in their imago state, is confirmed still more strongly by facts. "I once was observing," says Kirby, "the motions of an apion, under a pocket microscope. On seeing me, it receded: upon my making a slight but distant noise, its antennæ started. I repeated the noise several times, and invariably with the same effect. A harpalus, which I was holding in my hand, answered the sound in the same manner, repeatedly. Flies, I have observed, at brisk and distinct sounds, move all ten legs: and spiders will quit their prey, and retire to their hiding places." Insects that live in society give notice of intended movements, or assemble their citizens for emigration, by a certain hum. This occurs in the evening, and is continued even during the night; all seems to be in a bustle, the greatest restlessness agitates the bees. Sometimes to hear this hum the ear must be placed close to the hive, when clear and sharp sounds may be distinguished, which appear to be produced by the vibration of the wings of a single bee. This hum has been gravely construed by some into an harangue of the queen to animate her subjects to the great undertaking which she now meditates—the founding of a new empire. "There sometimes seem to happen suddenly amongst them," says Reaumur, "events which put all the bees in motion, for which no account can be given. If you observe a hive with attention, you may often remain a long time and hear only a slight murmur, and then, all in a moment, a sonorous hum will be excited, and the workers, as if seized by a panic terror, may be seen running off in different directions. At these moments, if a young queen goes out, she will be followed by a numerous troop."

The various sounds produced by insects, suggest that they must have the power of hearing. "Our male green field-hoppers," says De Geer, "in that part of the right wing-case which is folded horizontally over the trunk, have a round plate made of a very fine transparent membrane, resembling a little mirror, or piece of talc, and as tense as a drum. It is surrounded by a strong and prominent nervure, but is concealed under the fold of the left wing-case, where there are also strong nervures corresponding with what may be called the hoop of the drum. It is exceedingly probable that the quick motion with which the insect rubs these nervures against each other, produces a vibration in the membrane, whence the sound is augmented." By alternating the motion rapidly from right to left, the sound is produced in an almost continued strain.

But the power of hearing in these creatures is placed beyond all doubt. Brunelli, an Italian naturalist, kept and fed several males of a grasshopper, not uncommon with us, in a closet, which were very merry, and continued singing all the day; but a rap at the door would stop them instantly. By practice he learned to imitate their chirping: when he did this at the door, at first a few would answer him in a low note, and then the whole party would take up the tune and sing with all their might. He once shut up a male in his garden, and gave the female her liberty; but as soon as she heard the male chirp, she flew to him immediately.

The grasshoppers and locusts produce their chirp by applying the hind shank to the thigh, rubbing it smartly against the wing-case, and alternating the right and left legs. They have also a drum, like the preceding family, for augmenting the sound. "On each side," says De Geer, "of the first segment of the abdomen, immediately above the origin of the hind thighs, there is a large deep opening, somewhat oval in form, and partly closed by an irregular flat plate or lid, of a hard substance, but covered by a flexible, wrinkled membrane. The opening left by the lid is in form of a half-moon, and at the bottom of the cavity is a white membrane, shining like a mirror, and tensely stretched. On the side of the opening, towards the head, there is a small oval hole, into which the point of a pin may easily pass; and when the membrane is removed, a large cavity is brought into view. The whole of this apparatus seems to contribute much both to produce and to increase the sound caused by insects."

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## SCRIPTURE EXPLANATIONS. No. XXIV.

### THE SEVEN CHURCHES OF ASIA.

### Their History and present State.

Ephesus, in the time of the Romans, was the metropolis of proconsular Asia. This celebrated city, the vast remains of which give a high idea of its former beauty, extent, and magnificence, was situated in that part of Asia which was anciently called Ionia, (but now Natolia,) about five miles from the Ægean sea, on the sides and at the foot of a range of mountains overlooking a fine plain that was watered and fertilized by the river Cayster. Ephesus was particularly celebrated for the temple of Diana, a most magnificent and stately edifice, which had been erected at the common expense of the inhabitants of Asia Proper, and was reputed one of the seven wonders of the world: but the very site of this magnificent and celebrated edifice is now undetermined, though some stupendous columns in the large mosque, there is reason to believe, once graced that structure. Widely scattered and noble ruins attest the splendour of the theatre mentioned in Acts xix. 31; the elevated situation of which, on Mount Prion, accounts for the ease with which an immense multitude was collected; the loud shouts of whose voices, reverberated from the neighbouring mount Corissus, would not a little augment the uproar which was occasioned by the populace rushing into the theatre, just below which is the public place where the law proceedings were going forward, to which the town-clerk referred Demetrius and his companions. In the time of Saint Paul, this city abounded with orators and philosophers; and its inhabitants, in their gentile state, were celebrated for their idolatry and skill in magic, as well as for their luxury and licentiousness.

The present [illegible] striking illustration of the accomplishment of prophecy. Ephesus is the first of the apocalyptic churches addressed by the evangelist in the name of our Lord Jesus Christ. "His charge against her is a declension in religious fervour, Rev. ii. 4; and his threat in consequence, (verse 5,) a total extinction of her ecclesiastical brightness. After a protracted struggle with the sword of Rome, and the sophisms of the gnostics, Ephesus at last gave way. The incipient indifference, censured by the warning voice of the prophet, increased to a total forgetfulness; till at length the threatenings of the Apocalypse were fulfilled, and Ephesus sunk with the general overthrow of the Greek empire in the fourteenth century."

Ephesus is now under the dominion of the Turks, and is in a state of almost total ruin; innumerable inscriptions are lying about in disorder or neglect, or built into the Turkish structures. The plough has passed over the city; and in March 1826, green corn was growing, in all directions, amidst the forsaken ruins; and one solitary Greek only was found, who bore the name of Christ, instead of its once flourishing church. Where once assembled thousands exclaimed, "Great is Diana of the Ephesians," now the eagle yells, and the jackal moans. As for the stork, the ruins of Ephesus are her house. This bird is seen perching in all directions upon the summits of the buildings, or hovering round them in the air, or fixing its immense nest, like the capital of a column, on the large masses of ruins.

SMYRNA, a city of Asia Minor, was situated about forty miles to the north of Ephesus, of which city it was originally a colony. It is now celebrated chiefly for the number, wealth, and commerce of the inhabitants. Of its population, which is estimated at about 75,000 inhabitants, 45,000 are Turks; 15,000 Greeks; 8000 Armenians; 8,000 Jews; and less than 1,000 Europeans. There are more than twenty mosques in Smyrna, and three Greek churches, and the Jews have several synagogues. The angel of the church of Smyrna, addressed in the second apocalyptic epistle, is supposed to have been Polycarp, the disciple of Saint John, by whom he was appointed bishop of Smyrna. As he afterwards suffered much, being burnt alive at Smyrna, A. D. 166, the exhortation in Rev. ii. 10 would be peculiarly calculated to support and encourage him. Smyrna will ever interest the real christian. On the firmness of the early martyrs depended, under Divine Providence, the transmission of the truth to the latest generations.

PERGAMOS was the ancient metropolis of Mysia, and the residence of the Attalian kings; it still preserves many vestiges of its ancient magnificence. Against the church at Pergamos, was adduced the charge of instability, Rev. ii. 14, 15, but to its wavering faith was promised the all-powerful protection of God. "The errors of Balaam and the Nicolaitanes have been purged away. Pergamos has been preserved from the destroyer; and three thousand christians" (out of a population of about 15,000 inhabitants) "now cherish the rites of their religion in the same spot where it was planted by the hands of Saint Paul, though, alas! their religion has little in common with the faith taught by the apostle, but the name and profession. Of these christians, about 200 belong to the Armenian communion; the remainder are members of the Greek church. They have each one church, but the other churches of Pergamos have been converted into mosques, and are profaned with the blasphemies of the pseudo-prophet, Mohammed. There are also about 100 jews, who have a synagogue. Pergamos, or Bergamo, as it is now called, is about sixty-four miles north of Smyrna.

THYATIRA, a city of Asia Minor, was a considerable city in the road from Pergamos to Sardis, and about forty-eight miles eastward of the former. It is called by the Turks, Akhisar, and is embosomed in cypresses and poplars; it is now, as anciently it was, celebrated for dyeing, and large quantities of cloths, dyed scarlet, are sent weekly to Smyrna. In 1826, the population was estimated at 300 Greek houses, thirty Armenian, and 1000 Turkish. Each of the two former have a church. The streets are narrow and dirty.

SARDIS, the metropolis of the region of Lydia, in Asia Minor, is situated near mount Tmolus, between thirty and forty miles east from Smyrna. It was celebrated for great opulence, and for the voluptuous and debauched manners of its inhabitants. Considerable ruins still attest the ancient splendour of this once celebrated capital of Crœsus and the Lydian kings, which is now reduced to a wretched village, called Sart, consisting of a few mud huts occupied by Turkish herdsmen. "A great portion of the ground once occupied by this imperial city, is now a smooth grassy plain, browsed over by the sheep of the peasants, or trodden by the camels of the caravan; and all that remains to point out the site of its glory, is a few disjointed pillars, and the crumbling rock of the Acropolis." The ruins are more entirely gone to decay than in most of the ancient cities in those parts. No christians reside on the spot; two Greek servants of a Turkish miller, in 1826, were the only representatives of the church at Sardis; the present state of which affords a most striking illustration of the accomplishment of the prophetic denunciation against the church in that city—A name to live, while dead.

(To be continued.)

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## SIMPLE MACHINES—THE LEVER.

(Continued from page 133.)

THE balance, as we have already stated, is a lever of the first order, with equal arms, and its use is to determine unknown weights. The balance, as made by the best workmen, consists of a light beam of some inflexible material, but its shape differs according to the caprice or skill of the constructor. Ramsden's celebrated balance-beam consisted of two cones, joined at their bases, and to the centre of the beam is attached a finely polished knife-edge, which works upon polished agates; but that these delicate edges may not be injured by reclining for any length of time on the agate planes, supporting the whole weight of the balance, two upright forks are provided, which may be elevated by touching a small attached lever or screw, which causes them to seize the beam, and hold it suspended. A good instrument for philosophical purposes, should indicate to 1-30,000th part of the weight in the scale. In all well-constructed beams the centre of gravity is immediately under the centre of motion, that is the axis; for if it be above the axis, the slightest motion will cause it to upset, being in a state of instable equilibrium; and if the centre of motion be also the centre of gravity, then the arms will rest indifferently in any position.

The general theory of weighing is, to place the substance whose weight is required in one scale, and to add weights to the opposite scale until the balance beam is in equilibrio. But in weighing bodies that have but little weight, there are many circumstances to be attended to, or the weight cannot be accurately estimated. The weights themselves must not be touched with the fingers, for the heat that would be communicated, might be sufficient to cause light currents of air that would derange the balance, even if no impurity were communicated. These currents of air must be carefully guarded against, and it is therefore desirable to remove the weights by means of a small pair of nippers. It was once asserted that the principle called caloric, or heat, had weight, because a flask of water weighs more when the liquid is cold, than when it is hot; but this does not arise from any influence that caloric has upon weight, but because a current of air is produced when the temperature is raised, which ceases when the water is cold.

It is often advantageous in delicate chemical experiments requiring the art of weighing, to be able to construct your own small weights; and this may at any time be done. Take a length of silver or platinum wire, the latter is preferable, weighing, for instance, one grain. By carefully measuring the length, it is easy to determine the proportionate lengths required to produce any given weight less than a grain. Supposing that a weight one-hundredth of a grain be required, measure a piece of wire weighing exactly one grain, and one-hundredth part of the whole length will give the weight required: in this way the student may construct the smallest possible weights by using wires of proportional thinness.

Another modification of the lever used to determine the weight of bodies, is the Roman balance, or common steelyard, which is, strictly speaking, a lever of the first order. It consists of an iron beam moving on a pivot, having one arm much longer than the other. These two arms are so balanced that the beam is horizontal when unloaded. A hook is fixed to the shorter arm on which the substance to be weighed is suspended. On the longer arm a determined weight is placed, which slides into any position, and the equilibrium of the lever or weight of the body is obtained, by bringing the weight nearer to, or further from, the centre of motion. The longer arm being graduated, the point at which the weight remains will give the weight of the body. This instrument is well known, being commonly used in families, and in some trades. Its principle of action is the same as the lever, that is to say, the weight multiplied into its distance from the fulcrum, is equal to the power multiplied into its distance.

There are many other modifications of the lever adapted to weighing, as the Danish balance, Brady's balance, and others, to which we cannot at present refer; all these, however, act upon the same principle, and the reader may easily acquaint himself fully with the action of this beautiful though simple machine, by taking all the opportunities which present themselves of applying the law we have explained.

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## USEFULNESS OF METALS.

If a convincing and familiar proof of the extensive application of the metals to the common purposes of life were required, we need only refer to the case of many a common cottager, who could not carry on his daily concerns and occupations without the assistance of several of the metals. He could not, for instance, make his larger purchases, nor pay his rent, without silver, gold, and copper. Without iron, he could neither dig, nor plough, nor reap; and, with respect to his habitation, there is scarcely a part of the structure itself, or of the furniture contained in it, which is not held together, to a greater or less extent, by means of the same metal; and many articles are either entirely of iron, or of iron partially, and superficially coated with tin. Zinc, and copper, and antimony, and lead, and tin, are component parts of his pewter and brazen utensils. Quicksilver is a main ingredient in the metallic coating of his humble mirror; cobalt and platina, and metals perhaps more rare and costly than these, as chrome, are employed in the glazing of his drinking cups and jugs. So that of the whole number of metals made use of by society at large, for common purposes, more than half of them are either directly used by the mere peasant, or enter into the composition of the furniture and implements employed by him. —*Professor Kidd.*

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## THE FORCE OF CONSCIENCE.

The following remarkable instance of the force of conscience occurred a few days since in the neighbourhood of London. A lady, about thirty-eight years of age, elegantly dressed, entered the shop of Mr. ——, a respectable pastry-cook, in a state of great mental excitement, and inquired if Mr. —— were still alive. On being answered in the affirmative, she, in the most earnest manner, begged to see him. Being engaged in superintending the making of some confectionary, he begged to be excused, and referred her to his daughter, who, he said, would wait upon her. The daughter immediately withdrew with her into the parlour; when, after sitting a few moments in silence, she burst into a flood of tears. When she became more composed, she stated, that upwards of twenty years since, she had been a boarder at a highly respectable boarding-school in that neighbourhood, which school Mr. —— had for nearly forty years supplied with pastry, &c.; and while there, she had been in the habit of abstracting small articles from his tray, unknown to the person who brought it. She had now been married some years, was the mother of six children, and in the possession of every happiness this world could afford; but still the remembrance of her youthful sin had so haunted her conscience, that she was never happy. Her husband, perceiving her unhappiness, had, after many fruitless endeavours, at last got possession of the cause, when he advised her, for the easement of her conscience, to see if Mr. —— were alive, and to make him or his family a recompence; and as she was going to leave London on the following day, perhaps for ever, she had then come for that purpose. Mr. ——, on being informed of the object of her visit, told her not to make herself any longer unhappy, as she was not the only young lady who had acted in that manner. After begging his forgiveness, which he most readily granted, she insisted on his acceptance of a sum of money, which, she said, she believed was about the value of the articles she had stolen; and after remaining about an hour, she departed, evidently much happier.

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## THE GLORY OF SCRIPTURE.

Then do we find food for our souls in the word of truth, then do we taste how gracious the Lord is therein, then is the scripture full of refreshment to us, as a spring of living water, when we are taken into a blessed view of the glory of Christ therein. This is the glory of the scripture, that it is the great, the only outward means of representing unto us the glory of Christ: and He is the Sun in the firmament thereof, which only hath light in itself, and communicates it to all other things besides, John i. 9; v. 39; Col. i. 15—19.—*Dr. Owen.*

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## NOTHING USELESS.

An extensive manufacture is carried on in Leeds, by which old woollen rags are made into new cloth. The rags are subjected to a machine which tears them in pieces, and reduces them nearly to their primitive state of wool: they are then, with a small admixture of new wool, again carded, slubbed, spun, and woven, and made into a cloth; not very strong, but answering very well for paddings, and other purposes of a similar nature. So extensive is this manufacture, that it is said five million pounds weight of woollen rags are yearly exported for Germany and other parts for this purpose.

Philosophers say that "nothing is lost in nature," and it seems nothing is lost in art. Linen rags are converted into paper, and now a use is discovered for woollen rags, by transmuting them into cloth. How ingenious is the skill of man! and how vast the difference betwixt instinct and reason, if not in their nature, certainly in their application.

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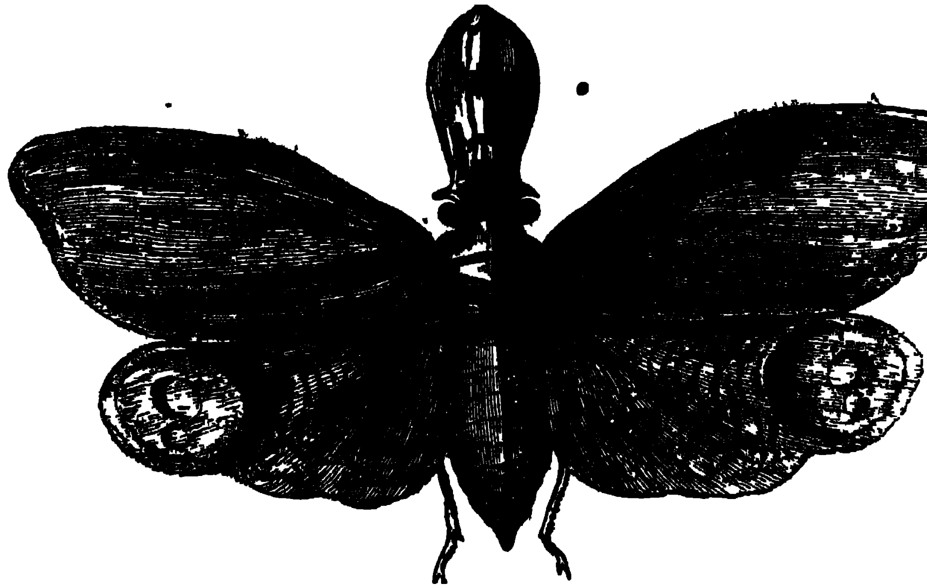

LANTERN-FLY OF BRAZIL, TWO-THIRDS NATURAL SIZE.

Wings brown, powdered with white dots and dark-brown dashes and zigzag lines, with a beautiful peacock-eye on the tip of the under wings, the centre of the eye is light yellowish brown, with a white dot in the middle encircled by brown, and a brown circle surrounds the whole.

### ON LUMINOUS INSECTS.

SHOULD any of our readers, at least on the southern parts of this island, take a summer evening's ramble along lanes with high mossy banks, and hedges of hawthorn, sweetbriar, and honeysuckle, where, shrouded in thick foliage, the nightingale is pouring out her song, he will most probably see the bank here and there studded with living sparks of fire, and at once recognise them as glow-worms. The glow-worm is the wingless female of a winged beetle, (*Lampyris noctiluca,*) which itself is not, as has been supposed, altogether destitute of the property of giving out light, though in a very trifling degree. The female of this beetle might be mistaken for the larva of some insect, and is very different in appearance from its less illuminated but aerial mate. The luminous property of the glow-worm is confined to the three last ventral segments of the abdomen, which are apparently capable of being withdrawn, so that the insect can either conceal the light, or allow it to shine at will. A species of insect allied to our glow-worm, but of which both sexes are alike winged, (*Pygolampsis Italica,*) is very abundant in Italy; and when numbers are seen glittering like stars flitting about at night through the woods and groves, the effect is said to be extremely beautiful. To return, however, to our island, we may observe that the glow-worm is not the only luminous insect which bespangles the dewy lawn: a very common species of centipede, (*Geophilus electricus,*) which resides under clods of earth during the day, and crawls forth at night, possesses this luminous property. It is abundant in gardens, at least in the neighbourhood of London, and the southern counties, and cannot fail to have been observed during dark, moonless nights, glowing with phosphorescent radiance along the garden walks and the grass-plats. An allied species, the *Geophilus phosphoreus,* is a native of Asia.

Europe, however, cannot vie with the

Fire-Fly, *(Elater Noctilucus,)* from nature; natural Size. Colour—Chestnut Brown.

hotter regions of the globe in the brilliancy of its luminous insects; it is in the regions of the humming-bird, that winged gem whose lustre seems borrowed from a tropic sun, that we are to seek for the insect lamps of night, "now motionless and dark, eluding search,"—"and anon starring the sky" "like a shower of fire." Most have heard of the fire-fly of St. Domingo and the West India islands. The fire-fly is an insect of the beetle tribe, (*Elater noctilucus,*) about an inch in length, and one-third in breadth; "it gives out its principal light from two transparent eye-like tubercles, placed upon the *thorax* (chest;) but there are also two luminous patches concealed under the *elytra,* (horny wing-cases,) which are not visible except when the insect is flying, at which time it appears adorned with four brilliant gems of the most beautiful golden blue lustre; in fact, the whole body is full of light, which shines out between the abdominal segments when stretched. We are told that the original natives (a race whose memory even is passing away) were formerly accustomed to employ "these living lamps, which they called *Cucuij,* instead of candles, in their evening household occupations. In travelling at night they used to tie one to each great toe, and in fishing and hunting required no other flambeau." Besides this, they were sought for and encouraged in houses, and especially sleeping-rooms, as extirpators of gnats, which constitute a great part of their food. (See Decades of the New World, by P. Martire, quoted in Southey's *Madoc.*) The fire-fly is common in the inter-tropical regions of the American continent, as well as the West Indies. In addition to the *E. noctilucus,* the *E. ignitus,* and several other allied species, are also luminous. But of all luminous insects, by far the most transcendent (if the accounts of writers are to be at all credited) are some of the *Hemipterous* order, and of the genus *Fulgora.* Of these the lantern fly of South America (*Fulgora laternaria*) is said to be pre-eminent. This beautiful insect, of which we give a sketch from nature, (see page 145,) is, according to the measurement of the specimen before us, more than two inches and a half in length, with a hollow transparent projection of the head, seven lines in length, (some individuals are larger in both respects,) which is the organ whence has been said to issue the lamp-like flame. "Madame Merion," says Kirby, "informs us that the first discovery which she made of this property caused her no small alarm. The Indians had brought her several of these insects, which by day-light exhibited no extraordinary appearance, and she enclosed them in a box until she should have an opportunity of drawing them, placing it upon a table in her lodging-room. In the middle of the night the confined insects made such a noise as to awake her, and she opened the box, the inside of which, to her great astonishment, appeared all in a blaze: and, in her fright, letting it fall, she was not less surprised to see each of the insects apparently on fire. She soon, however, divined the cause of this unexpected phenomenon, and re-inclosed her brilliant guests in their place of confinement. She adds, that the light of one of these *Fulgoræ* is sufficiently bright to read a newspaper by: and though the tale of her drawing one of these insects by its own light, is without foundation, she doubtless might have done so had she chosen."

The *Fulgora laternaria* is said to be not the only blazing lamp of the genus; China produces one, little its inferior, the *F. candelaria,* provided with a slender recurved hollow projection from the head, in which resides the luminous matter; and India (see Donovan's Insects of India) produces another, the *F. pyrrhorhynchus,* having a smaller snout than *F. laternaria,* of a deep purple hue, with a transparent tip of intense scarlet; and as these tints will be imparted to the transmitted light, the effect produced must, of course, be most splendid and striking.

It must, however, be confessed, notwithstanding Madame Merion's tale, which savours no little of the romantic, that the luminous power of the *Fulgoræ* is very hypothetical. In shrillness of voice, and in many of their habits, they resemble the tree crickets; but late observers, who have closely investigated the natural history of these insects, and of the lantern fly of South America, in particular, deny that any luminous property is situated either in the hollow lantern of the head, or in any other part of the body; and affirm that the received account is altogether fabulous. Sieber, a practised entomologist, who took numbers of Fulgoræ during his stay in the Brazils, (where he continued for several years,) treats the whole as a ridiculous fable; in which statement he is borne out by observers, whose testimony we have personally heard, and who assert that the Indians regard the tale as originating in the mistake of the white men, who, seeing the fire-fly (*Elater noctilucus*) glancing about like a meteor, have in some unaccountable manner attributed its luminosity to the Fulgora, perhaps because they could conceive no other use for the hollow projection from its head, than that of a lantern. The true nature of the luminous property of insects is not yet fully understood; neither is the use of this singular provision very satisfactorily made out. In the glow-worm it has been conjectured to be a beacon-light to its mate, but this is not a sufficient explanation as it respects other luminous insects, where both sexes are alike lamp-lit. How great a part of our Creator's ways in nature are past finding out! and can we then wonder if mysteries which bewilder us amidst the mazes of speculation, occur in the revelation of grace?

M.

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## CHEMISTRY.—No. VII.

### SELENIUM, CHLORINE, IODINE, BROMINE, BORON, FLUORINE, SILICON.

Berzelius, a native of Sweden, and an eminent chemist, discovered, when examining the products of a copper mine, a new substance, in combination with sulphur and copper, to which he gave the name of selenium. This substance is of a grey colour, and in some respects resembles the metals: it is slightly transparent, is insoluble in water, and possesses a metallic lustre, and on this account some chemists have classed it with the metals. It is, however, more closely allied to sulphur and phosphorus, in its general properties. It combines with sulphur, chlorine, and carbon, and it may be easily distinguished from all other substances by its peculiar odour, which greatly resembles that of the horse-radish.

Chlorine may be distinguished by its yellowish green colour, and by its power of destroying all vegetable colours. It may be obtained from marine plants, and was formerly considered an acid, being called oxymuriatic acid, but experiment has proved that oxygen is not an element in its composition. Chlorine exists either as a gas, or in combination with water; it occasions suffocation when inspired by animals; is a supporter of combustion, and is of great importance to many manufacturers, particularly the bleacher. When united with hydrogen, it forms muriatic acid, one of the most useful of all the compounds, of which it is a constituent part.

Iodine may be obtained from kelp, or the ashes of sea-weed, and is a substance that bears a near resemblance, in many respects, to chlorine. As a gas, it is distinguished by its violet colour. In its pure state it is poisonous, and, like chlorine, destroys all vegetable colours.

Bromine, also, has a close resemblance to chlorine; but as it is of no value, either in the arts or as a medical agent, it will be unnecessary that we should describe its properties.

Boron is the base of an article of commerce called borax, frequently employed by manufacturers and physicians. Boron is a dark, opaque, olive-coloured powder, and incapable of fusion. When united with oxygen, it forms boracic acid, which, combined with soda, forms borax.

Many of our readers are probably acquainted with the substance commonly called Derbyshire spar, of which many ornamental and useful things are made. It has been usually called, by chemists, fluate of lime, but recent experiments have proved that it is a fluate of calcium. The base of this compound is a simple substance, designated fluorine. It is of a chocolate colour, a supporter of combustion, and a destroyer of animal life. It cannot be presented in a separate form, and is consequently only known in its combination with other bodies.

There is one other simple substance that remains to be noticed under the present head, called silicon; it is the basis of flint, quartz, and many other compounds. When combined with oxygen, it forms silica, an earth of great importance in the arts, of which we shall give a full description when we speak of that class of bodies to which it belongs.

### THE HISTORY OF BOTANY.

It is only within the few last years, that Botany, considered scientifically, and as a branch of Natural History, has attained to that degree of perfection and beauty which it may now be said to possess. Prior to the time of Linnè, the great Swedish naturalist, it could hardly be considered as a science, inasmuch as it possessed few of the requisite qualities, and those only in a slight degree. The ancient Greeks and Romans, as well as the early Britons, were, indeed, acquainted with the names and qualities of many plants and vegetable productions; they knew the difference between a tree, a shrub, and a herb, distinctions which have prevailed in every nation; but they were in want of a regular classification, which would equally extend to, and embrace all, and by which they might readily distinguish particular genera and species (to use modern terms.) Amongst them, plants were generally considered either in a medicinal or domestic point of view; this of necessity very much confined their ideas, for, restrained within such limits, they could only extend to a part, and that a very small part of the vegetable kingdom. The system itself, therefore, (if system it can be called,) was a very imperfect one, and required the alteration which a far more comprehensive acquaintance with nature could afford. Perceiving this necessity, the ancient philosophers, and particularly Aristotle, applied themselves to the task; he was the first who wrote a complete system of Natural History: but of all the branches which he treated of, he paid least attention to the vegetable arrangement, his studies being chiefly directed to the animal kingdom, or what is now called zoology. After him, Theophrastus, his pupil, and finally, successor in his school, studied the science, and wrote a work, about the year 330, B. C., in which he gives a description of upwards of five hundred plants. The Romans also, about the year 73, B. C., soon after the Mithridatic war, engaged in the study; and Cato and Varro wrote on it; they did not, however, bestow a special and undivided attention upon the subject.

In the first century of the christian era, this science began to languish, and remained almost forgotten, except by Apuleius and one or two others, till about the sixteenth century, when it was again brought into notice by one Brunfels, a German. Once revived, it continued advancing gradually with little intermission, till the time of Linnè, who began to write about the year 1736, and continued to prosecute the study with the most determined perseverance, till about 1776. His famous work, "Systema Plantarum," and another, "Genera Plantarum," went through many editions after his death, and were finally translated into English. The first clearly demonstrated the sexual nature of plants, on which he founded that system which has received his name, and which is, with various alterations, almost universally received in the present day. He also materially improved botanical terminology in general, which is universally acknowledged the most difficult part of the study, on which, in a measure, depends the practical application of the whole system. After him, John Thedwig, Professor of Botany at Leipzig, appeared, who arranged the mosses, lichens, ferns, &c., consisting of the lower, though in many cases more beautiful orders of vegetable life, which had been left almost untouched by Linnè. He discovered the fructification and sexual organs of the mosses, in which his predecessor (Linnè) had erred; and completely formed the whole of our present class, cryptogamia.

About this time a new era in botanical science arose, in the discovery, or rather, application of the natural system; classing plants, not according to the number or situation of their stamens and pistils, but according to their natural affinities. This was first carried into effect in 1759, by Bernard de Jussieu, who arranged in this manner all the plants in the botanical garden of Trianon, near Paris; and in 1789, his nephew Antoine Laurent de Jussieu published his "Genera Plantarum Secundum Ordines Naturales Disposita." Since this publication, many improvements have been made in the system, especially within the few last years, by Robert Brown, Decandolle, Professor Lindley, and many others. We have now given our readers a brief outline of the history of botany, from ancient time to the present date; mentioning a few who have distinguished themselves in the science, either by their discoveries or improvements; still, however, we cannot pass over unnoticed that great friend and patron of botanical study, Sir J. E. Smith, whose assiduous and persevering labours have never, perhaps, been excelled, and but seldom equalled, and whose name will ever remain dear to the lovers of the green fields and hedge-rows, the beauties of which he has so ably and clearly displayed.

C. A.

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### THE JOYFUL PROSPECT IN THE MIDST OF CONFLICT.

Jesus Christ helps and delivers his people in conflict by the nearer prospect of the rest of heaven. How often have generals animated their soldiers with the hope of soon seeing their peaceful homes, their fathers, brothers, sisters, friends, all anxiously waiting to congratulate them on their victory. Think, O tried believers, of your eternal home, to which Jesus, your Captain, will soon conduct your souls, and in due time your bodies also. You have a Father there, the most gentle, gracious, and affectionate, that ever bore that name of love. You have brothers there and sisters also, even all that ever lived who, through grace, repented of sin, believed in Christ, and fought the good fight. You have friends there, whom you have never seen in the flesh, but who long to see you with them in that pleasant land. And there, they are all so loving, so pure, so gentle, and so gracious; they are all of such kindred minds and congenial spirits; they will all welcome you so gladly, telling you their gracious history, and listening to yours, and adoring with you your common Saviour; that the very thought of that happy meeting, in that land of peace, should re-animate the most fainting among you, to go on praying, believing, wrestling, with holy perseverance, till his or her turn to enter into rest shall in due order come.

And then, no more conflict! Ye angels, write that upon the jasper walls! Spirits of the just made perfect, chaunt that with your golden harps! Ye that are to wear garments made white in the blood of the Lamb, and to carry palm-branches in your hand, anticipate that song now. There shall be no more conflict! There is no war in heaven now! Flesh and blood, in their present state, shall not enter there! No law in the members shall militate against the law of the mind there! No evil world, no crafty tempter there! Blessed, my brethren, whatever our selfish, ignorant minds may sometimes object, thrice "blessed are the dead, which die in the Lord."—*Hambleton.*

### THE SOLAR SYSTEM.

In page 113, of the first vol. of the Weekly Visitor, the reader will find a representation of the planetary system, accompanied with an interesting account of their sizes, motions, distances, &c. We shall endeavour to show that the highest and most extended ideas we can ever form of these subjects, more especially as relates to distances, will still fall very far short of the truth: that it will for ever baffle the human intellect to form any thing like an adequate conception of the immensity of creation, even that limited portion of it cognizable by our senses, even when aided by instruments.

When we hear of bodies like our earth being several millions of miles from the sun, we ought to endeavour to form something like an accurate idea of the number denoted by the word million. It is not, perhaps, difficult, having the idea of a mile, to conceive of a 100 miles. It is not, however, easy to conceive, except we have actually passed over the distance, of a 1000 miles; and it is only by a very powerful effort of a mind accustomed to judge of great distances, that 25,000 miles, the circumference of our planet, can be adequately presented to the mind's eye. Now it would take more than forty times the circumference of the earth to make one million of miles! Or, to show this in another light, let a line be drawn of such a length that every inch shall represent a mile; then a million miles on this scale would require the line to be more than a mile and a half long! Or, if a person were to attempt to count the number, and were to count 120 every minute, without ceasing, it would take him six days, all but about five hours, to accomplish his task! allowing not a single moment's cessation from the commencement to the completion of his labour. Now Mercury, the nearest of the planets yet discovered, is thirty-seven millions of miles from the sun; while the most distant, Herschel, is not less than 1800 millions! *

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* A million sovereigns, placed singly in a line, so as to touch one another, would reach more than fifteen miles in length; placed one upon the other, they would form a column nearly a mile in height, wanting only about twenty-four yards. The weight of such a number would be 7 tons, 16 cwts., 3 qrs., 15lbs., or a full load for two wagons, drawn by four horses each.

A million leaves of paper, of about the same quality as the reader now holds in his hand, would be more than one hundred yards in thickness, or if laid upon the ground, would be more than half as high again as the monument! A million pages of the same size as those in this book, if spread out singly, but close together, so as to lose no space between them, would occupy nearly 7½ acres, or one-fourth larger than Grosvenor-square!

At this feast he bade farewell to his old friends and companions, whom he had invited to meet the Saviour. On this occasion, he doubtless gave a statement of the reasons which had induced him to abandon his "calling," and to become a disciple of the despised Nazarene; and finally relinquished his employment.

It would have been a suspicious and hazardous meeting for Matthew, if Jesus had not been there. But as the entertainment was in honour of his illustrious Master, he felt no hesitation in sending his invitation to his former associates, for such were frequently the attendants of the Saviour. "This man receiveth sinners."

There was another reason which might have influenced this newly converted and obedient tax-gatherer, in the selection of his guests. His heart was burning with love to Christ, and hence to the souls of men. Saved himself, he wished to bring all to salvation. And how could he better show his love to his friends, and how hope to benefit them at his parting, more than by introducing them to the Redeemer? He hoped and prayed, that as Jesus had "snatched him as a brand from the burning," so he would display his matchless grace, in saving many of his companions. Nor is it improbable, that many were saved at that interview.

This conjecture is supported by the conversation that arose betwixt Jesus and the pharisees, who, either as guests or spectators, had expressed surprise and disgust that Jesus should "feast with publicans and sinners." His reply was cutting to the proud pharisee, and cheering to the trembling publican: "I came not to call the righteous, but sinners to repentance." What joy must have beamed in Matthew's countenance, at these words of Christ. His prayers would now ascend for the conversion of his guests; his hope would be elated to the greatest degree, that as the very persons were assembled whom he specially became incarnate to save, so he would bestow on them his mercy and love.

"Nothing too hard for the Lord;" Matthew, the publican, is saved! His prompt and cheerful obedience, and his endeavours to bring others to Christ, are the evidences of his conversion. Blessed evidences! May every reader possess them.

◆

## THE POWER OF ANIMALCULÆ.

VORACIOUS beasts, says the Journal of a Naturalist, might ravage our flocks and our herds, but could scarcely accomplish greater injuries than the seeming despicable creatures, weevils, wire-worms, thripes, aphides, or those atoms which we denominate blight. The feeble aphis, now crawling over my paper, with limbs exceedingly slender, seems yet endowed with every requisite for a larger body; joints, integuments, circulation of fluids, and every mechanical activity requisite for its well-being; and yet the whole is so fragile as to be overturned by the puff of my breath. But smallness of bulk is no criterion of inferiority of power: an apple tree, several feet, perhaps, in its circumference, spreading its branches over a rood of land, sickens and dies, from the puncture of the *aphis lanata*, a creature so small as to leave the distinction of joint and limb imperceptible to the naked eye.

◆

## RESIGNATION.

FENELON, Archbishop of Cambray, author of Telemachus, when his illustrious pupil the Duke of Burgundy lay dead in his coffin, on coming into the room where the nobles of his court stood weeping around the corpse—fixing his eyes upon it, broke out, at length, in terms to this effect: "There lies my beloved Prince, for whom my affection was equal to the tenderest parent. Nor was my affection lost; he loved me in return, with the ardour of a son. There he lies, and all my worldly happiness lies dead with him. But, if the turning of a straw would call him back to life, I would not, for ten thousand worlds, be the turner of that straw, in opposition to the will of God."

◆

## EATING AND DRINKING.

BY a sparingness in diet, and eating as much as may be what is light and easy of digestion, I shall, doubtless, be able to think more clearly, and shall gain time. First, by lengthening out my life. Secondly, I shall need less time for digestion after meals. Thirdly, I shall be able to study more closely, without injury to my health. Fourthly, I shall need less time for sleep. Fifthly, I shall more seldom be troubled with the head-ache.—*President Edwards.*

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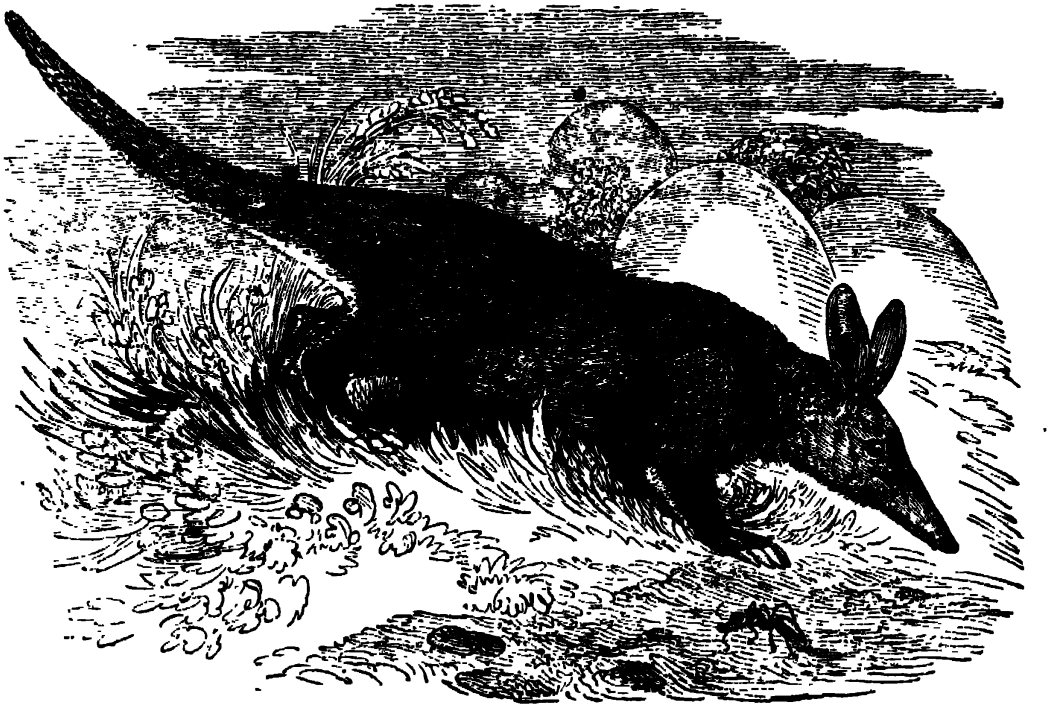


THE CAPE ANT-EATER, OR AARDVARK.

The singular animal which we now present to our readers, is a native of Southern Africa, where in some districts it is very common, and from its habits has acquired the name of Aardvark, or Earth Hog. For a long time it was considered by naturalists as a species of the great South American ant-eater, (*Myrmecophaga jubata*,) of which we have previously given a figure and description. See *Weekly Visitor*, vol. i. p. 137. It differs, however, essentially from that animal, in the possession of molar teeth, the structure of which is not a little singular. They are of a cylindrical form, perforated, longitudinally, with an infinite number of minute tubes, such as we observe in a piece of cane, to which they bear a close resemblance. Their surface is nearly flat, and well adapted for the bruising of the soft insects upon which the creature feeds. The nails are hoof-like, strong, and well adapted for the purpose of excavating the ground. The head is elongated, the limbs are short and powerful; the hair is scanty, especially about the head, and approaches bristles in its texture, being coarse and stiff; the toes are four in number before, and five on each posterior limb. The tongue is extensible, though not to so great a degree as in the American ant-eater. The food of this animal consists exclusively of the ants, whose dome-like buildings are so numerous in the places adjacent to the Gariep river, and in other localities, in the thinly-peopled districts of South Africa.

Mr. Burchell, returning from the river alluded to, says, "We travelled over a plain of boundless extent, producing much grass in some places, and a few bushes of tarconanthus and rhigozum . . . . . . Innumerable ant-hills, of large dimensions, interrupted the evenness of the surface; they were of an obtuse conical form, and so hard and firm as to bear the weight of a man, yet the wheels of a loaded wagon easily cut through them.

"Sometimes, however, they are found to resist even this weight, and, in such cases, are carefully avoided, to prevent an overturn. This hardness is, perhaps, owing rather to the nature of the soil than to a different species of insect. The height of the hillocks was generally from two to three feet, but higher were not unfrequently seen. Their structure was irregularly cellular, not unlike a volcanic honey-comb stone; or, rather, consisted of perforations, or passages, opening into each other, without any apparently methodical plan. Such is the solid and firm work of these little architects, which the aardvark spends its life in assaulting for the sake of the builders and inmates, which it devours by wholesale. Not, however, that it completely demolishes the domes of compact earth; it suffices to make a breach, out of which as the terrified population emerge, they fall into the power of their foe. The dwelling of the ant-eater itself is a burrow, at a little distance beneath the surface of the ground, out of which it comes forth only during the night; for in its habits it is completely nocturnal; hence, during the day, it is seldom to be seen, but may be observed as the dusk approaches, creeping from its hole intent upon its prey."

The talented traveller, from whom we have already quoted, details an instance in which one of his wagons had been nearly overturned by the sinking of one of the wheels in the burrow of an aardvark. This name he goes on to say is the colonial appellation of the animal, and is justified by its general similarity in outward figure to a hog, though its habits are very different. "With its fore-feet, which are admirably formed for that use, it digs a deep hole, wherein it lies concealed the whole of the day, never venturing out but at night, when it repairs to feed at the ant-hills, which abound in many parts of the country. Scratching a hole on one side of them, it disturbs the little community; on which the insects, running about in confusion, are easily drawn into the animal's mouth, by the long slender tongue with which nature has provided it for this purpose. Without tusks, or any efficient teeth, this animal is quite defenceless, and depends for its safety solely on concealment, in which it so completely succeeds, that no animal is so seldom seen; and from its power of burrowing, with incredible rapidity, away from those who endeavour to dig it out of its retreat, few are more difficult to be obtained. Its flesh is wholesome and well-tasted."

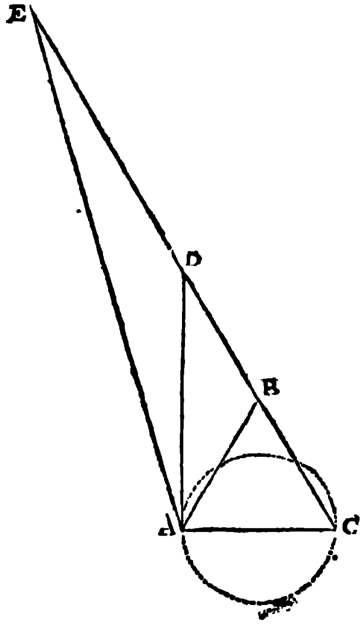
The general colour of the Cape ant-eater is a dark or blackish brown, passing into black on the limbs. The body is of an elongated form, the tail being long and tapering. Total length of our specimen, four feet six inches.

We give a figure of the animal, surrounded by ants' nests, with one of the insects on which it feeds. M.

## THE FIXED STARS.

We attempted to show, in a former paper, the great distances at which some of the planets of our system are placed from the sun. Every one who is possessed of even a moderate acquaintance with astronomy, is aware that the distances of the fixed stars far exceed even the most remote of the planets yet discovered in the solar system. Indeed, so great is the disproportion between them, that the distance of Herschel, contrasted with the distance of the nearest of the fixed stars, sinks almost into absolute insignificance. They are considered by all modern astronomers as suns, shining by their own native light, and most probably the centres of other systems. The nearest of the fixed stars yet observed, is supposed, on good grounds, to be not less than 41,040,000,000,000 (or forty-one billions) of miles distant. The reader may perhaps be ready to ask how this can be ascertained; we answer, By means of their annual parallax, which we will endeavour to explain.

As the earth revolves round the sun, at the distance of 95,000,000 miles, its orbit (which differs but little, comparatively, from a circle) must be 190,000,000 miles in diameter; consequently, whatever part of her orbit the earth may occupy at any given time, she will, in half a revolution, answering to half a year, be 190,000,000 miles distant from the spot she occupied before. This, it is natural to suppose, causes the fixed stars to be viewed at different angles to the plane of the earth's orbit, at different times of the year: this angle is called the parallax, and as whatever changes of position a star may make, will all be gone through in the course of a year, this is called their annual parallax. It necessarily follows that the greater the distance of any star, the less will be its annual parallax. Modern astronomers, amongst whom Dr. Bradley may be mentioned, have endeavoured to ascertain what this parallax might amount to. The star $\gamma$ in Draco was selected for this purpose, as, from its being situated near the zenith, it was the less liable to error arising from refraction. A series of most careful and accurate observations were made upon this star, and the result was, that Dr. Bradley did not think the parallax to amount to a second; and the exceedingly numerous and careful observations made by astronomers since his time, corroborate his opinion. It is difficult to ascertain correctly so small a quantity as the fraction of a second, and hardly perhaps will the observations of any two persons exactly correspond. By comparing together numerous observations, the difference between one observer and another is greatly neutralized; and, if they are very numerous, it may almost be made to disappear altogether. Let us, however, take it for granted, in order to arrive at the conclusion to which it will conduct us, that a star has one second parallax. Then it can be proved by the most rigid demonstration that such a star cannot be less distant than 41,040,000,000,000, or forty-one billions and forty thousand millions of miles! The following figure will show how this may be proved.



Let A B C represent an equilateral triangle, and upon the same base A C, draw the triangle A D C, making the side C D double the length of C B, by continuing the line C B to D. Then whatever may be the width of the angle at B, the angle at D will exactly equal one half of the angle at B. If the triangle A B C be equilateral, then the angle at B will be sixty degrees, and the angle at D thirty degrees. In like manner, if we draw another triangle A E C upon the same base A C by continuing the line C D to E, and making C E just double the length of C D, then the angle at E will be just one half of the angle at D, or fifteen degrees. Now it is easy to find out by calculation, how many times the length of the base A C of the triangle must be repeated, in order to make an angle of one second at its apex. As sixty seconds make one minute, and sixty minutes one degree, we have only to take the cube of sixty, which is 216,000: the number of times the base of an equilateral triangle must be repeated to form an angle of one second at its apex. If we conceive the circle in the preceding figure to denote the earth's orbit, and A C, the base of the triangle, its diameter, then it is plain that we have only to multiply A C, the diameter of the earth's orbit, or 190,000,000 miles, by 216,000, to find the distance of a star whose parallax is one second. This will amount to 41,040,000,000,000 of miles! as we stated before. A distance so great that even light itself, travelling as it does at the rate of twelve million miles a minute, would not traverse in less time than six years and a half! Indeed, it has been thought by some astronomers, that some of the fixed stars are so distant that their light has not reached us yet, supposing 6000 years to have elapsed since they were created. All the researches of astronomers since Dr. Bradley's time, have tended to corroborate his opinion; and there is but little doubt that the allowance of even one second parallax to any of the fixed stars, is greater than the truth, and that consequently their absolute distance must be considerably greater than we have stated.

How astonishing, how overwhelming are numbers and distances like these! The human mind is not formed to grasp them, and hardly, perhaps, can any finite intellects conceive them. All the seconds of time that have elapsed since the creation of the world until now, would not exceed the *fifth part of one billion!* Surely it becomes us to exclaim with the psalmist, "When I consider thy heavens, the work of thy fingers, the moon and the stars which thou hast ordained, Lord, what is man, that thou art mindful of him?"

E.

◆

## BOTANY. No. V.

### RANUNCULACEÆ.

THIS order embraces the various species of ranunculus, or crow-foot, hellebore, columbine, larkspur, clematis, and several other field and garden flowers, which are pretty generally known to all classes of readers. The leading characters which are common to all the members of this order, consist in the presence of a calyx, or outer cup, composed of several distinct leaves, and a corolla of several petals, which may each of them be separated without disturbing the rest. Another characteristic of still more importance than the last-mentioned, is founded in the number and situation of the stamens. These are always more than twenty in number, and are seated upon the receptacle below the seed vessels.

If the attentive reader will take a flower of the common buttercup, and pull off the calyx leaves and petals, one by one, he will find that all the stamens are left behind. This is what we mean by saying that the stamens are seated upon the receptacle, intending by the receptacle that point upon which the seed-vessels or fruit are immediately placed. If, for the sake of mutual comparison, he will in the next place take a rose, and follow the same proceeding, in plucking off the leaves of the calyx and the petals one by one, he will perceive that very few, if any, of the stamens are left behind. For, in this last instance, they are seated upon the calyx, and consequently were removed with it.

Simple as the fact elicited by this experiment may appear, its interpretation is of the highest importance, for the stamens, by remaining after the calyx is removed, indicate, almost without exception, that the plant is poisonous; but by following the calyx in its departure, they inform us, that the fruit, when ripe, will certainly be harmless, and not only harmless, but grateful and friendly to man.

This proves beyond a question, that however dry and uninteresting botanical details may sometimes be thought, they are not without their practical consequences. We cannot, therefore, sufficiently admire the goodness of the Almighty Creator, who has inscribed a caution on one hand, and an invitation on the other, if men would be at the pains to read and understand it. We have somewhere read that a person in Sweden, having eaten some of the fresh leaves of the common garden Monkshood, became maniacal. But the surgeon who was called to his assistance, being informed the cause of the unfortunate person's ravings, declared that the plant could not occasion them, and to convince the bystanders, as he thought, that they were mistaken, he ate himself very freely of the same fresh leaves, and, sad to tell, he soon after expired, in the greatest agonies. Now, had he been acquainted with this poison-mark which we have pointed out, he would not have been so rash as to encounter such a terrible risk.

From the stamens, the student should next direct his attention to the seed-vessels, which are generally numerous, and are gathered into a cluster upon the little central pillar, as in the crow-foot, anemone, and the clematis. The petals of this order, when present, are objects of curiosity, and will always repay the trouble of a closer examination. Few things, perhaps, are better known than the flower of the buttercup; but there is a piece of information about the petals of this familiar plant, which will be new to our readers, who have not turned their minds to this subject. At the base of each petal there is a small cavity, easily seen when the eye is in search of it, which secretes a small quantity of pure honey. The species of the ranunculus or buttercup, natives of this country, amount to fifteen; but in every one of them is this little honied pore, as it is called, to be found, and thus furnishes a ready and unerring character of the genus. The drop of honey lodged in this cavity is, in a singular manner, contrasted with the poisonous plant which produces it. How it magnifies the wisdom of the contrivance, when we see a drop of sweetness, encompassed by poison of a most fatal and acrid character. For the poisonous qualities of these plants are not confined to one part, but the flowers, leaves, stem, and root, have been found to be equally full of the same pernicious juices. What an emblem of all earthly pleasure, without religion, is this little drop of honey, presented in its poisonous cup! the eye sees the honey and longs to obtain it, but it is so small, that it cannot be tasted without tasting the poison also. The petals in the hellebore, figured on p. 157, in which they consist of a minute tube, with a two-lipped mouth or opening; in the columbine, *(aquilegia vulgaris)* they resemble little horns or cornets. In various other plants belonging to this order, a curious diversity is noticed in the shape of the petals, which diversity or singularity of shape is connected with, and indicative of another fact—the secretion of honey. It generally happens, not only among these, but in all plants, where any odd appearance is noticed in the conformation of its blossoms, that honey will be found in some little obscure nook or corner.

The first genus to which we shall call the attention of our readers, is the ranunculus, which is, as we have described, readily distinguished from similar plants, as the marsh marigold, for example, by the presence of the honied pore. All plants of this genus are poisonous, and the bruised leaves may be used in raising blisters instead of the Spanish fly, which gives the biting effect to blister-salve. Care should be taken in examining these plants, that they do not come in contact with a sore or cut upon the hand, for they will certainly create an inflammation in the part. Some botanists have had their hands inflamed by merely carrying them home, but this was perhaps owing to some peculiar state of the skin, for we have often handled them without any ill effects from it.

As these plants are poisonous, they ought to be known, that we may be on our guard against them; we will therefore describe the common species by such marks as cannot fail of distinguishing them from each other; while the student, with a little care and a pair of gloves, will find a very interesting and instructive employment in tracing their respective differences.

*R. Flammula,* Less Spear-wort.—Leaves narrow, flowers small and yellow, in boggy places. Hampstead Heath, plentiful.

*R. Sceleratus,* Round-leaved Water-crowfoot.—Lower leaves pale shining green, round, like the palm of the hand, upper ones resembling two or three fingers laid together.

*R. Aquatilis,* Water-crowfoot.—Flowers white, floating on the surface of the water. Leaves of two sorts, one round and floating, the other hair-like, and under water. Seen almost in every pond.

*R. Acris,* Buttercups.—Leaves divided into many sharp segments. Pastures and road sides. Our readers will be, perhaps, a little surprised when we tell them that some of those terrible sores which, upon the legs and feet of beggars, have excited their pity, are kept in that frightful state by the application of this plant.

*R. Bulbosus,* Bulbous-rooted Crow-foot.—Pull up the plant, and the large bulbous swelling upon it will show to what species it belongs.

*R. Repens,* Creeping Crow-foot.—Stem lying upon the ground, and shooting out roots at its joints.

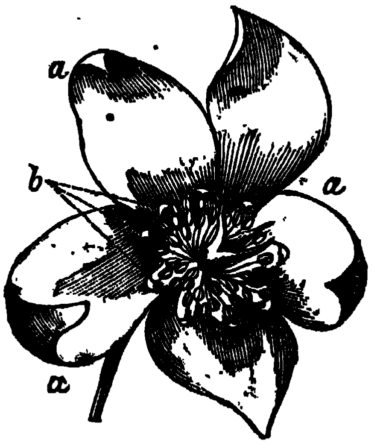
*Caltha.*—Distinguished from the ranunculus by the absence of the honied pore.

*C. Palustris,* Marsh Marigold.—Easily known from all other plants by its large conspicuous yellow flowers, and its broad heart-shaped leaves. Common in all shallow streams of water.

*Aquilegia.*—Distinguished by the five horn-shaped petals.

*A. Vulgaris,* Columbine.—This name is derived from the Latin term for a dove, and given to this plant from a fancied resemblance which the petals bear to the neck and bill of that bird.

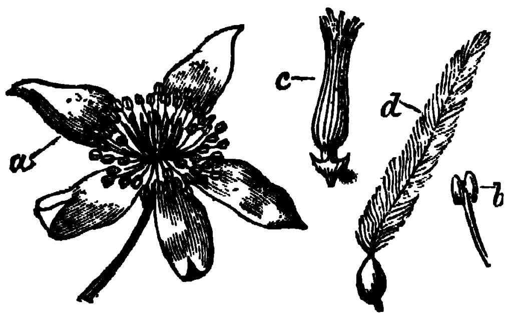
*Helleborus.*—The generic character consists in the eight tubular petals represented in the following figure of the helleborus viridis, or green hellebore, where *b* directs the eye to three of them. The reader who has a relish for botanical pursuits, will find entertainment in attentively surveying these curiously formed organs: their tubular structure, like a little sack ending in a two-lipped opening, which to a fanciful eye resembles a mouth, with the drop of honey lodged in their bottom: *a a* are the leaves of calyx, which in this species are green, whence the name.



The green hellebore is a native of this country, and is found in woods. We found it some years ago under a bank by the road-side, whence it was conveyed, planted in a garden, and seemed to flourish well in its new situation.

*H. Niger,* Black hellebore or Christmas dose.—Common in our gardens. It is a native of Austria and Italy, and was first cultivated in this country by Gerarde, in 1596. This appears to be the plant of antiquity, which was so famous for repairing the lost wits of distracted people. It grew at two places, both called Anticyra, in Greece. Hence it was customary, instead of telling a man to go to bedlam, to propose a voyage to Anticyra, which might be construed as only a gentle recommendation to travel for the benefit of his health. The wisdom-restoring virtues of this weed admit of an easy explanation. The mind affects the stomach, and the stomach in its turn affects the mind. If the digestive organs are out of order, the mind is troubled. Now, when the stomach was burdened, the active properties of the hellebore afforded relief, and consequently removed the cause that had disordered the wits.

*Clematis.*—Several species of this genus are cultivated in our gardens, where they are distinguished by a climbing habit, and a copious display of white flowers. The clematis vitalba, or traveller's joy, is a native of this country, and in autumn forms a conspicuous object in our hedges, by its polished green leaves, and the fine hackled threads which form a tail-like appendage to the seed. The following cut



represents the flower and its parts: *a* is one of the calyx leaves, *c* the central bundle of filaments, each of which terminates the seed, and is finally expanded into the ~~feathered tail.~~ At the bottom is the seed, which is conveyed to a distance by the elegant appendage just described: *b* points to one cell of the anther, which is placed upon the outside of the filament, and at a distance from the other cell. In many plants these cells are placed like a pair of tubes, side by side, but in the ranunculaceæ they are distinct, and lie upon the back of the filament. This distinction is minute, but important, and if the garden clematis be examined just before the flower opens, this peculiarity will be obvious. If the clematis be not at hand, a bud, just ready to bloom, of the buttercup, will furnish stamens to exemplify this characteristic of the present order.

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### THE LOVE OF HOLINESS IS THE WORK OF GOD'S GRACE!

The true believer is a regenerate person. The apostle describes the new character of a child of God when he says of himself, "I delight in the law of God after the inward man." That description suits no unregenerate person. The law of God is so holy, spiritual, and good, and so opposed to the bias of fallen man's corruptions, that the natural man cannot look up to the heart-searching God, and say with sincerity and truth, "I delight in thy law, O God, after the inward man." On the contrary, he heartily hates that law, wishes it were less holy, or even that there were no law of God at all. Is it not so? When in your ungodly state, was there not a desire that the law of God did not thwart you, that there were no account to be given hereafter, that you might be left to live as you list? But if there were no law, there were no God. For the law is the copy of God's will: if God is, he must have a will; if he is holy, his will, and therefore his law, must be holy. Perhaps, you thought it not, but in fact you used to wish, either that there were no God, or that he were an unholy being. Oh, what an atheist's wish in the former case! What a heathen's wish in the latter! In either case, how full of ignorance, presumption, and guilt! May God, who knew it, forgive thee, for Christ's sake, that thought of thy heart!

This then, I maintain, that although there is in all men a natural conscience, which confesses a distinction between good and evil; although there is in virtue a majesty, which often commands the respect even of the vicious; yet there is nothing in an unregenerate soul, which corresponds with this principle of delighting in the law of God after the inward man. No, brethren, no: the charmer may charm ever so wisely, but in vain; the minstrel may exert his utmost skill, and pour forth strains sweet as the melodies of heaven, but there is no chord which vibrates to his touch when he appeals to sinners, dead in trespasses and sins, in praise of the beauty of holiness and the loveliness of spiritual religion. Listen, for instance, to the sweet singer of Israel, and see whether any carnal heart rejoices to echo his sentiments: "I will delight myself in thy statutes," Psalm cxix. 16. "Thy testimonies are my delight, and my counsellors," Psalm cxix. 24. "I will delight myself in thy commandments, which I have loved," Psalm cxix. 47. "The law of thy mouth is better unto me than thousands of gold and silver," Psalm cxix. 72. "O how love I thy law! it is my meditation all the day," Psalm cxix. 97. "I hate vain thoughts: but thy law do I love," Psalm cxix. 113. "Thy word is very pure: therefore thy servant loveth it," Psalm cxix. 140. The whole, in fact, of the 119th Psalm will furnish an invaluable test for self-examination on the question, Am I a true believer? am I a child of God? Job also speaks of his delight in the law of God: "I have esteemed the words of his mouth more than my necessary food," Job xxiii. 12. In Isaiah, God himself thus characterizes his believing people: "Hearken unto me, ye that know righteousness, the people in whose heart is my law," Isa. li. 7.

The truth is, in working into the heart a godly sorrow for sin, and a lively faith in Christ, as the only atonement for sin, and the Lord our righteousness, the Holy Spirit gives such a sense of the evil and malignity of sin, and such a perception of the goodness, holiness, and love of God, with such a constraining love to Christ, for having loved us even unto death, that henceforth a hatred of all sin, with a love to all holiness, springs up in every believing soul. And now, the light of holiness and truth is found to suit the renewed mind, just as the light of day suits the natural eye. Now, also, mere outward decency of conduct does not satisfy; a partial reformation is felt to be insufficient; the inward man longs after holiness, the hidden man of the heart delights itself in the law of God; the mainspring within of all that is lovely and of good report, is touched by a Divine hand.

If there were no other principle left, and if none of the old leaven continued to work, the whole man would be entirely sanctified; men on earth would be as the angels in heaven; every individual believer would be completely, what he now is but partially, a living temple to the living God, filled with his glory, ever fervent with praise, radiant with the beauty of holiness.—*Hambleton.*

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## OLD HUMPHREY ON EXCELLENT IDEAS.

I WAS sitting at a table by myself, in the corner of a public coffee-room, pondering on the pages of a book which an old friend had just lent me, now and then taking a sip of coffee, and occasionally casting a glance at the flickering gas-light, which flared within a few feet of the table.

There were several well-dressed young men at the opposite end of the room, engaged in conversation, but so deeply occupied was I with my book, and my own speculations, that most likely not a word of all they said would have distinctly reached me, had it not been for an exclamation, in which one of them frequently indulged. Scarcely five minutes elapsed without his crying out, "That's an excellent idea!"

After hearing this several times, I directed my eyes towards the speaker, who was gaily dressed, with a gold chain across his bosom, and a showy ring on the little finger of each hand. "That's an excellent idea," said he again, just at the moment that I lifted up my head, and I then felt a little solicitude to catch one or two of the many "excellent ideas," that were falling around me.

What a poor, perishing world is this, whether we consider it as an abiding place, or with respect to the fulfilment of those hopes which are continually rising in our restless hearts! Every day presents us with proofs that this is not "our rest," and every hour brings forth enough to convince us that our earthly hopes, like bubbles on the running stream, only glitter one moment to burst into empty nothingness on the next. How often are we expecting much from sources that yield but little!

There may, or may not be wisdom in thus indulging in a passing reflection, when relating a common-place occurrence, but it is a habit of mine, and Old Humphrey cannot see, hear, read, write, or converse, without now and then throwing in a passing reflection.

Well, as I said, I was on the look out for "excellent ideas." These are not, certainly, very often to be met with, and you may as well expect to see pineapples on blackberry bushes, as to hear "excellent ideas" from the thoughtless and the vain; but the old proverb says, "It never rains but it pours;" and however scarce "excellent ideas" may be in general, yet if I might judge by the exclamations that reached me, I was in a fair way of falling in with a profusion of them.

Though I appeared to pore over my book, my ears were wide open to what was going on at the other end of the room.

The conversation was on the subject of cigars, and one of the party thought it would be no bad thing to take one to church with him the next time he went there.

"That's an excellent idea," exclaimed the one in the gold chain.

The excellency of this idea did not at all strike me; on the contrary, it seemed to me to be thoughtless, silly, and profane. I, however, still kept my ears open.

"Tom," said one of them soon after, "what do you think? in passing by the blind Scotchman at the Regent's-park, I dropped a pebble stone into his hat: 'Thank you,' said the old fellow, who thought he had got a capital catch."

"An excellent idea!" again cried out the one with gold chains.

The excellency of this idea was quite as indistinct to me as the former one. I thought both the idea and the act were mean, wanton, and cruel; but the conversation changed.

"How did you manage, Ned, with your watch?" asked one.

"O," replied he who was addressed, "I persuaded the watchmaker that it had a gold key to it when I left it with him, a keepsake that I would not have parted with for double its value; and so he was glad enough to get off without charging me any thing for the new spring."

"An excellent idea!" once more exclaimed the ornamented admirer of this fraudulent ingenuity.

Now, excellent as this was pronounced to be, it was nothing less than impudence, deceit, and dishonesty.

"Well," thinks I, "if Old Humphrey ~~has not~~ had quite enough 'excellent ideas' for one day, it's a pity;" so drinking up the last drop that was left at the bottom of my coffee-cup, I closed my book, and walked away, musing on the weakness, the folly, the heartlessness, and immorality of the world.

When a man picks up stones in good earnest, to throw at his neighbour's windows, he may very soon break a great many panes; and, in like manner, when he sets about finding fault with those around him, he is never long at a loss for something to find fault with. I soon made out a long catalogue, not of "ideas" only, but of plans and undertakings, which, though considered "excellent" by thousands of people, are weak, worthless, and wicked. It was truly astonishing how clearly I saw the errors of others, how sagely I reflected on the matter, and how eloquently I reproved the follies and frailties of mankind.

At last it occurred to me that it might not be amiss, after going abroad so much, to come a little nearer home; for perhaps I might find in my own head and heart some "excellent ideas," and admirable undertakings, not a whit more valuable than those of my neighbours.

What an ignorant, vain, presumptuous, and inconsistent being is man! How much he knows of others, how little of himself! How quick is he to condemn the faults of his fellow-sinners, and how slow to amend his own! I had worked myself up to a pitch of virtuous indignation; I had arraigned others of manifold misdemeanors, and performed the offices of jury and judge to my own satisfaction, disposing of every case as I thought proper. You may be sure that I felt a little high-minded; but when I brought up Old Humphrey himself to the bar, I was soon humbled, even to the dust.

"It's bad enough," said I, "when the young act a foolish part, thinking that 'excellent' which is unworthy, and pursuing folly instead of wisdom: but what excuse has he whose hairs are grey, who has had the experience of a lengthened life to assist him, and who has long taken upon him to instruct others in the way they should go? What excuse has such an one as Old Humphrey to offer, when the light, hollow, frothy things of time, are estimated by him as 'very excellent,' and pursued with more ardour than the things of eternity?"

Of all ploughing and harrowing, the ploughing and harrowing of our own hearts is the hardest work, and I think I may add the most productive of good. I felt determined to give myself no quarter. I had been fierce as a lion in my attack, but was tame as a lamb when obliged to defend myself; and after half an hour's rigid examination of my own heart, you might have trodden on the toes of Old Humphrey without his reproaching you; so much was he humbled in his own estimation.

It may be that you also have been pluming yourself on some "excellent ideas," which will no more bear the test of christian consideration than some of mine. If it be so, try, at least, to avoid bitterness, and to manifest a forbearing spirit towards an offending brother. If we have both erred, let us both try to amend together; for however "excellent" our "ideas" may be, one practical illustration of the christian principle of forbearance and charity will be worth them all.

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THE

WEEKLY VISITOR.

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THE BANANA.

THE Banana, is the *Musa Sapientium* of Linnæus, who converted the Egyptian name mauz into the more classical form of musa; intending, perhaps, at the same time, to commemorate Antonius Musa, the physician of Augustus. It grows plentifully in all the warmer climates, and flourishes prodigiously wherever it meets with a rich and crumbling soil. The name of plantain tree, which it bears in some places, is from the Spanish *platano*, which is itself derived from *planta*, the latin term for an offset, in allusion to the young shoots which spring in great plenty from the root, to succeed their short-lived parent. The rapidity with which this tree waxes from a tender plant to a magnificent tree, is one of the most remarkable features of its history. Within the brief span of two years, it has commenced its existence as a bud, spread forth its lofty and imposing foliage, borne a massy cluster of fruit, and exhibited all the symptoms of decay and immediate dissolution. But the shortness of its existence is amply made up by the number of its offspring; its stay is short indeed, but the young trees which hasten to supply the place of their forerunner, leave us no reason to complain.

The banana affords a pleasing and affecting instance of that system of compensation which pervades all the orders of creation. The same kind hand that has withheld one advantage, bestows another to fill up its room, that in the end there may be no lack.

The tree under consideration dies after a short period of utility, but it dies only to make way for others to spring up, which in the following year will do as much for the eater as if the space and productiveness of the old tree had been continued. In the mountains they often grow wild, as loving a black and mouldering soil, which is there furnished by the moisture and decayed vegetables. But if you want a plantation of bananas, where they are found, you have only to raise a fence by laying stones together, as represented in the sketch at the top of this paper, fill the area with loose soil of rotten vegetables, plant a few offsets removed with their attendant roots, and all is done. Year after year you may look for crops of bananas, without troubling yourself to clear the ground, or dress it with manure; for the old trees by heat and moisture are soon decomposed, and thus furnish a pabulum for their successors. We need not inform the intelligent reader, that wherever vegetables are cultivated or made to grow on a variety of soils, there are also a great variety of kinds. The potatoes will furnish an easy exemplification; for they are raised upon soils differing widely in quality; we have therefore many sorts of potatoes. In like manner, the banana vegetates on soils and in situations of great dissimilarity: we find, therefore, a numerous assortment of fruit, differing in size, from a foot in length to an inch and a half. Their qualities are no less varied: some cannot be eaten till they have been boiled; others possess the most delicious flavour, in the fullest state of ripeness. There is a sort of " kind deceit " in the banana: the stomach, in hot climates, is apt after fatigue to loathe food, but the ripe fruit of the banana is welcomed; for the wearied person being enticed by the name of fruit, eats, and presently finds by experience, that it was not only to please the palate that he had eaten, but to replenish the exhausted powers of nature. We can speak from observation, and can bear witness, without exaggeration, that there is no other fruit which is at once so grateful and nutritive as that of the banana.

The fruit is of an oblong three-cornered shape, and is arranged in a thick cluster upon the lower part of the fruit-stalk, as is represented in the sketch. The skin is tough and leathery, and finally turns to a bright yellow. The pulp is of an orange colour, with scarcely any traces of a seed. On the fruit-stalk the attentive reader discovers a bare space with a few scales, once occupied by the barren flowers, which fall off before the fruit ripens. These flowers contain a quantity of honey, and for that reason are attended by the humming-birds, who are said to live chiefly upon the nectareous juices of flowers.

While the writer was at Rio Janeiro, the stomachs of several of these little birds were opened, and found not only to contain the honey which they had thence obtained, but the insects which feed upon it. For the latter are often entangled in that sweetness which had allured them, and in this way become the easy prey of the humming-birds. These feathered beauties not only feed upon honey, but the honey-suckers also.

The leaves of this tree are remarkable for the beauty of their veins, which run parallel to each other, and so form a series of delicate lines from one end to the other. At these, however, the leaf soon rends asunder, and gives the spectator the first notice of the coming fall. These leaves are applied to a singular purpose by the natives of the South Sea Islands, and are made to fulfil an office, which no stranger would ever think of guessing. For who would imagine that to dress a joint or a fowl after the best possible method, was to wrap it up in green leaves! Yet this is the approved practice, and has the double effect of preventing the respective evils of roasting and boiling; namely, the loss of nutriment in one instance, and the hardening of the fibre in the other. They impart no taste to mar its flavour, defend it from being burnt, and check the egress of its juices. It seems not, in the nature of things, possible to invent an apparatus that should answer the purpose more completely than a heated oven, which is merely a hole in the earth, a few large stones, and an envelope or dressing of banana leaves.

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## THE BENEVOLENT SUNDAY-SCHOLAR.

A CLERGYMAN from one of our Western States, says the " New York Observer," a few weeks since, visited the town of H., New Hampshire. On the sabbath, he represented to the congregation the wants of a feeble church, in the place where he resided, who were then struggling to build a house of worship. A son of the clergyman of H., a lad of twelve, and a sabbath-scholar, listened to the account with deep interest. After worship, he applied to his father for a few halfpence, which he wished to contribute to aid the feeble church. But the father, to his regret, was compelled to deny him, as he had just emptied his own purse for some benevolent object. The next day was the fourth of July. There was to be a splendid celebration near, and the boy had received promise of this as a holiday. In the evening, the father sent him a short distance on an errand. On his way, he met with a farmer, to whom he offered his services for a moderate compensation. The farmer, being pressed in business, hired him; and the boy laboured faithfully all day, sacrificing the pleasures of his anticipated festivity for one shilling, which he joyfully contributed to aid the above-mentioned church.

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## CHEMISTRY. No. VIII.*

### EARTHS.—No. 1.

When we attempt to calculate the number of substances that belong to the mineral kingdom, it appears almost impossible that we should obtain any distinct or certain information concerning them. The diversified appearances of the various rocks, gems, ores, and metals, almost prevent us from attempting their classification. Certain distinguishing characteristics have, however, been discovered, by the investigation of their several properties; and the different mineral substances may, though so numerous, be arranged under distinct classes, each of which has some plain marks of distinction.

The particular class of substances which we now proceed to notice, is known by the name of Earths. "To a cursory observer, the earths appear infinitely diversified; so much so that he would probably think the different kinds innumerable. However, notwithstanding the various appearances of the earths under our feet, of that of the furrows of the field, and of the mountainous parts of the world, whose diversified strata present to our view substances of every texture, and of every shade, the whole is composed of only nine primitive earths; and as three of these occur but very seldom, the variety which is produced by the other six becomes the more remarkable. This may be fairly adduced as one instance of the infinite skill of the Deity, as it bespeaks an Artist, master of his work, acquainted with his materials. To give a still greater variety to the works of nature, these earths are endowed with an affinity for acids and metallic oxides; whence arise the gems, spars, and precious stones of every colour and every species."*

The earths are distinguished by the following general properties: they are tasteless; incapable of dissolution in water; unaffected by heat; and are between four and five times heavier than water. Most of the earths have been decomposed by Sir Humphrey Davy, and from the results of his experiments, there can be no doubt that all the earths are compounds of metals and oxygen or metallic oxides; but if there had remained any doubt after the investigations he made, recent experiments have proved the truth of the statement.

There are nine earths; called, silica, alumina, zirconia, glucina, yttria, barytes, strontites, lime, and magnesia. The last four are called alkaline earths, on account of their possessing certain properties which give them a resemblance to a class of bodies called alkalies.

All our readers are acquainted with a stone called flint, very frequently found, and distinguished from all others by its texture and hardness. This substance, in its pure state, is that earth called, in chemical language, silica, which is of a white colour, without smell, and capable of enduring the most violent degree of heat without alteration of character. It is very abundant in nature, and is the principal component of quartz, an extremely hard white substance, found in almost every part of the world, sometimes in a massive, and sometimes in a crystalline state; and it is the principal ingredient in gravels and sand. Though silica is not capable of fusion by the most intense heat, yet if it be mixed with the two alkalies, potash and soda, it may then be melted into glass. Mortar, earthenware, and cement, owe their hardness to the silica they contain, and it is the chief ingredient of those solid rocks which have resisted the effects of ages, and "constitute the most bulky materials of the solid parts of our globe." Silica enters into the composition of the amethyst, cornelian, Egyptian jaspar, opal, calcedony, agate, and other precious stones. Its specific gravity is 2½ degrees.

**Alumina**, so called from its being the base of alum, forms a very considerable part of the earth's crust. Its specific gravity is 2 degrees. Alumina might be properly termed a pure clay; it is, however, very rarely found in a state of purity. This earth is distinguished by its softness, its almost destitution of taste or smell when dry; and a peculiar odour, called an earthy smell, when moistened with water. It forms fuller's earth when mixed with fine silica. Alumina is subject to contraction when heated, and by this means acquires an extreme degree of hardness, a property which renders it an extensively useful substance, for various purposes. Bricks, earthenware, and crucibles for chemical purposes, are manufactured chiefly from clay; when heated alone, it is greatly liable to cracking, while silica is of a very brittle nature when employed under the same circumstances; but when these two substances are combined together, they burn well, and form articles of the most durable quality. The precious stone called sapphire is almost entirely composed of this earth, and it is also found in the beryl, emerald, and topaz.

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* When speaking of the formation of hydrogen, in page 108, it was not distinctly stated, that iron filings must be added to the dilute sulphuric acid, in order to obtain the gas. It is the iron which decomposes the water, and taking possession of the oxygen, liberates the hydrogen.

* Parkes.

The next earth that comes under our notice, is found in a mineral called zircon, and in the hyacinth, a precious stone from the island of Ceylon. When zirconia is separated from its combinations with other substances in these minerals, and presented in a pure state, it is a fine powder of a white colour, destitute of both taste and smell. But as it can only be obtained in small quantities, there is no possibility of its being rendered useful in the arts. The specific gravity of this earth is somewhat more than 4 degrees.

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### OLD HUMPHREY ON ALMANACKS.

"Time and tide," it is said, "stay for no man;" and one might suppose that the rapid progress of time much occupied men's minds at the present period, for never was there such an attempt made as there is now to divide time, and set its months, weeks, and days continually before us.

This is the age of almanacks: go where I will, if a stationer's shop is to be seen, the window is crowded with almanacks. You may buy one to put in your book-case, another to lie on your study table, a third to pin against the wall, and a fourth to paste in your hat-crown; so that whether at home or abroad, you never need be without an almanack.

As I pass through the world, I cannot but notice what is going on in it; and when inclined for reflection, a little thing is enough to furnish me with a subject. A molehill will do just as well as a mountain, and an almanack is as suitable as the library in the British Museum.

After standing, a short time, at a stationer's window the other day, sometimes gazing on the different publications that were there, and sometimes peeping between them at other things, I walked away musing on the subject of almanacks. "Well," thought I, "no doubt almanacks are good things, when put to a good use; but if otherwise, they leave us worse than they find us, because every one who does not grow better as he grows wiser, is a spendthrift of that time which is more precious than a king's ransom.

There are usually in almanacks so many chronological, astronomical, and meteorological observations, that with the little knowledge Old Humphrey possesses, he can hardly make top or tail of one half of them. Then there is that comet of Halley; when I think of it, it so puzzles my poor brains that it seems to take me with it into the wide region of space, whirling me millions of miles in so short a space of time, that I am quite giddy, and glad enough to get back to something more simple, and better suited to my plain understanding. Keep to common words, such as sun, moon, and stars, and I can get on pretty well; but talk to me about "the horizontal parallax," "the place of perihelion on the orbit," "the mean terrestrial radiation," and I am as much lost as if wandering without a guide in the Black Forest of Germany. Often do I think to myself, What an unspeakable mercy it is, that the ever-blessed book of truth, the Word of God, is written in such plain language: "When I consider thy heavens, the work of thy fingers, the moon and the stars, which thou hast ordained; what is man, that thou art mindful of him, or the son of man, that thou visitest him?"

It is very well to be told of the festivals, both fixed and moveable, but there is hardly one in ten of us that think any thing about them, except it be Christmas-day, Good-friday, Shrove-tuesday, Easter and Whitmondays, and Gunpowder-plot; and the words and deeds that are said and done on these days are too often of a kind not to be commended. Then there is Hilary Term, and Easter Term, and Trinity Term, and Michaelmas Term; but if one has neither a law-suit on hand, nor a son at one of the universities, these terms pass by "as the idle wind, that we regard not." As to the eclipses of the sun, folks had rather by half look at them through a smoked glass, than read of them in an almanack; but then, if it were not for the almanack, they would not know when to look. That will be a glorious time, or rather a glorious eternity, when we shall be able to look, not on God's creatures, but on God himself. We now see Him "through a glass darkly," but then we shall behold him "face to face."

An almanack often contains much information about the tides, very necessary to be known by many people, though not very important to Old Humphrey.. He has but little occasion to inquire about the tides of the Thames, but much to consider about "the swellings of Jordan."

There is generally, too, a table of the kings and queens of England: I look over the names of them sometimes, and think to myself, If these are now wearing heavenly crowns, all is well; and if not, their earthly crowns were of little value. In the list of lord mayor and aldermen, I see nothing but the names of strangers to me; and I have so little money in the bank of England, that the account of bank directors is seldom looked at. There is a heavenly treasury in which I would willingly lay up a store of riches that fade not away, but every year I have reason to mourn for being so sad a spendthrift of my mercies.

A correct list of charitable institutions, in an almanack, is a new feature, and one that pleases me much. It is a kind of set-off against the selfish, griping, grinding, hard-hearted uncharitableness of a money-getting, ungodly world! It is a page on which I gaze with pleasure; not an institution escapes me, but, like a bee banqueting on a bed of flowers, I rove from one charity to another with admiration and love of the benevolent hearts and hands thus banded together for the benefit of mankind.

Old Humphrey was once so situated at a country inn, that he could get no book to look at except an almanack, and never did he estimate one so highly before. Hunger makes a man relish his food, whether it be for the refreshment of the body or the mind; and that almanack furnished me with a capital mental meal. Even the commercial stamps supplied me with amusement, and the fares of the hackney coaches and watermen were read with interest.

We no longer stare and gape at the hieroglyphic picture in an almanack, as on a faithful exhibition of the wondrous events of the year before us. This is a folly that we now seem ashamed of; neither do we run to the almanack to deceive ourselves with an account of the weather. The unblushing effrontery of predictions is now "shorn of its strength," and we begin to think it possible that an almanack may be written by a mere man; a weak, erring, wayward, sinful man, of like passions and infirmities with ourselves. These things are advantages; but an almanack seems to be an endless subject, though it principally contains the records of time. Old Humphrey must, therefore, pursue it no further.

When earthly memorials shall cease, and when the sun and moon shall be blotted from the skies, may we, through Divine mercy, be found among those who "shall shine as the brightness of the firmament," and "as the stars for ever and ever."

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### WHAT IS DEATH?

Is it the extinction of animal life? Is it the annihilation of human existence? Is it a transition from one state of being into another? That it is not annihilation, but simply a transition of state, there is abundant evidence to prove. In the world around us, in physical creation, and in the operations of nature, there is no such thing as annihilation. There may be a variety and a vicissitude in the forms which nature may assume, but its destructibleness none can establish. It may undergo the process of decomposition; it may be embodied in new forms and modes of existence, but its annihilation no one can prove. If matter then, cannot be destroyed, is it likely that the soul will perish? If the human body, in the article of death, simply undergoes decomposition into its original elements, is it likely that the immaterial and intelligent part of man will cease for ever to exist?

That death is not annihilation, but a transition of state, may be inferred from analogy. Plants of various kinds, and animals of different genera, are known to exist in various and successive forms. That oak, which is now, by the beauty of its foliage and the stateliness of growth, the prince of the forest, was once an acorn. That eagle which soars aloft in all the majesty of flight, to reach, as it were, the sun was once shut up within a contracted shell. That butterfly which flutters in the breezes of a summer's day, has passed through many transformations, ere its present beauty and existence were possessed. If changes like these take place in the animal kingdom, and in the vegetable world, why not in man? If animals and plants exist in different modes, may not the change which he must undergo in death be nothing more than an alteration in the form of his existence?

The doctrine of our immortality, which on indirect arguments we have endeavoured to prove, is clearly revealed in sacred writ. Irrespective of direct assertions to establish the fact, other kinds of testimony are not wanting. In corroboration of our remark, we may refer to the representations which scripture gives of death. It is compared to a departure, it is likened to sleep. Believers are said to depart, not to expire; to sleep, not to die. "Them, also, which sleep in Jesus," says the apostle, "will God bring with him;" and when the transfiguration took place on mount Tabor, and Moses and Elias conversed with the Messiah, they spake of "the decease," namely, the departure, the going out, "which he was to accomplish in Jerusalem." Again, in Hebrews, "By faith Jacob, when he was a-dying, (departing,) blessed both the sons of Joseph;" and Peter says, "Moreover I will endeavour that ye may be able, after my decease, (the word means 'departure,') to have these things always in remembrance."[*] Who can read these and similar representations of death, contained in the sacred volume, and not perceive that they imply an existence beyond the present? The great change, so common to all, and so fearful in its consequences, is the going out of time into eternity, a departure from a temporary dwelling to an eternal mansion. It is the portal through which we must pass, either to the raptures of heaven, or agonies of hell.

Reader, can you for one moment think of death as an annihilation? Are you warranted to conclude that, because the animal functions cease to act, the soul is dead? Such is not the conclusion which reason, analogy, and scripture warrant. You are immortal; are you alive to a preparation for an unending state of existence? Your soul can never die, have you made any effort to secure its eternal bliss? "Fear Him," says Christ, "who has power to cast both soul and body into hell." E. G.

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## THE LIGHT-HOUSE.

HUMANITY as well as interest led to the adoption of light-houses, both as beacons and guides. The first attempts were rude, but improvements were soon made, and more elegant structures adorned the shore or the rock.

The "Pharos" of Alexandria, at the mouth of the Nile, was a splendid edifice, and its brilliant light was said to have been seen at the distance of one hundred miles. The colossal statue of Rhodes was considered one of the seven wonders of the world. Beneath the legs of this statue, which strode across the harbour, ships of the largest size could sail; and in one of its hands a light was placed to direct the mariner in his course.

One of the most remarkable light-houses in England, is the Eddystone, erected on a solitary rock opposite the coast of Plymouth. The present building was projected and completed by Smeaton in 1759, all the houses previously erected having been destroyed by fire or by storms. Its form was suggested to the architect by the trunk of an oak tree; broad at the base, circular, and gradually narrowing towards the centre, and then widening towards the top. It has withstood many a terrific tempest; and appears likely to stand firm amid the elemental wars for years to come. Its brilliant and far-seen light is the means of saving hundreds of lives from a watery grave.

1. Christians are to mankind, afloat on the tempestuous sea of life, what light-houses are to those "who go down to the sea in ships," and who transact business on the mighty deep. They are the "lights of the world," and by their sentiments, their instructions, their prayers, their conversations, and their lives, they "hold forth," like the colossal statue of Rhodes, or the Eddystone light-house, "the word of life," both as a beacon against danger, and as a guide to "the desired haven."

2. These radiant illuminators of our coasts must be elevated. The houses are of different heights, according to the nature of the shore, and the design to be answered. Whether of the loftiest or the lowest height, they fulfil the purposes for which they were erected. The disciples of Jesus are of various ranks, ages, stations, and degrees of talents, but they all enlighten the world. There is no room for boasting. "Unto every one is given grace according to the measure of the gift of Christ;" hence the light reflected will be in proportion to the light imparted, and to the position which he who is "the Light of the world" designs them to occupy.

Not unfrequently at the mouth of harbours, as at Harwich, two light-houses are erected; one more elevated than the other. One to guide the vessels in their approach to the coast, and the other to direct them in their entrance to the harbour. This end is accomplished not by their blended light, but by their relative positions on different heights. Both are necessary. Neither could be dispensed with but at the hazard of life and property. Thus, believers of humble station and talents, as well as those of the loftiest, in the same church, or congregation, or neighbourhood, are of indispensable, if not of equal importance. Each class shines in a particular direction, and thus both contribute to enlighten the surrounding darkness, to warn against insidious dangers, and to direct in safety to the port of happiness and glory. "The eye cannot say unto the hand, I have no need of thee: nor again the head to the feet, I have no need of you. Nay, much more those members of the body which seem to be more feeble, are necessary."

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[*] The word in these passages translated 'decease,' is εξοδος, which signifies 'going out,' or a 'departure.' In such a manner the primitive christians were accustomed to speak of death, as may be seen in Irenæus, Clemens, and others.

3. Light-houses require constant attention. They must be lighted at a given time: the reflectors must be kept in a state of unsullied brilliance, the lamps must be constantly watched and trimmed, lest the light should not be seen at the proper distance, and thus shipwreck should ensue. The servants of the Lord are required to have their "lamps always burning." Much watchfulness, attention, and prayer are necessary, to the purity, the brilliancy, and usefulness of their lives. Evil tempers, worldliness of mind, unbelief, and neglect of the means of grace, would obscure the brightness of their character, and thus might, by inducing false notions of the nature and importance of religion, endanger the safety of their fellow-immortals.

4. What would become of our ships, and our sailors, were all the light-houses to be extinguished? and what would be the state of this dark and dangerous world, were christians to be taken out of it, or to lose their characteristic devotedness to God? How dreary a scene would be presented! the hopes of mankind for eternity would be wrecked, and dismal despair would sit on the countenances of the navigators of the sea of life. Especially would this be the case, if, along with christians, christianity itself were to be extinguished. How cruel and wicked, then, are the attempts of infidels who would destroy the Bible, and establish the dreary reign of infidelity: a system whose light is darkness, and whose pretended illuminations are only as "*ignes fatui*," false flames, gleaming for a moment over the stagnant marshes in which they are generated.

It is a fine sentiment of the great Dr. Johnson, and applies alike to the infidel who would annihilate religion, and to the pretended christian who, by his selfishness, would prevent the spread of the gospel. "I know not how he that withholds the knowledge of the Divine will, or delays it, can be said 'to love his neighbour as himself.' He that voluntarily continues ignorance, is guilty of all the crimes that ignorance produces: as to him that should extinguish the tapers of a light-house, might be justly imputed all the calamities of shipwreck."

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## FUNERALS IN SWEDEN.

On the death of a native, the windows are shut, and the pictures and glasses in the house covered with white linen. The body is dressed and laid in the coffin, which is kept open till the day of interment; so that the friends, or any person who pleases, may view it. In the event of the death of persons of distinction, the bells are tolled at noon, and the name and age are written on a black board hung up at the church door. When persons, however, do not fall under this description, the bells are tolled at one o'clock. The mourners and friends of the deceased assemble at his house, where they are met by a clergyman, and the body being put into a hearse, is attended by six men, dressed in black, with white gloves. The clergyman takes the left of the hearse, and the company proceed according to their intimacy or connexion with the deceased, and their rank; the chief mourner taking precedence of all. The procession then moves from the house to the church, and, during the time, the bells are continually tolled. On arriving there, the coffin is placed on the bier before the altar. The clergyman takes his station at the head, and the rest of the company around the body, each having a prayer-book, which is open at some particular part, with an appropriate psalm, and all join in singing it. The minister reads the funeral service, when another psalm follows, and the whole solemnity is concluded with a benediction. The company return to the house of the deceased, where the reverend gentleman, in the name of the relatives, expresses thanks for the honour they have done them, when liqueurs are handed round, and the guests drink each other's health.—*Rae Wilson's Travels.*

### KEPLER, THE ASTRONOMER.

KEPLER concludes one of his astronomical works with the following prayer: "It remains only that I should now lift up to heaven my eyes and hands from the table of my pursuits, and humbly and devoutly supplicate the Father of lights. O Thou, who by the light of nature dost enkindle in us a desire after the light of grace, that by this Thou mayest translate us into the light of glory, I give Thee thanks, O Lord and Creator, that Thou hast gladdened me by Thy creation, when I was enraptured by the work of Thy hands. Behold! I have here completed a work of my calling with as much of intellectual strength as Thou hast granted me. I have declared the praise of Thy works to the men who will read the evidences of it, so far as my finite spirit could comprehend them, in their infinity. My mind endeavoured to its utmost to reach the truth by philosophy; but if any thing unworthy of Thee has been taught by me—a worm born and nourished in sin—do Thou teach me, that I may correct it. Have I been seduced into presumption by the admirable beauty of Thy works, or have I sought my own glory among men, in the construction of a work designed for Thine honour? O then graciously and mercifully forgive me; and finally grant me this favour, that this work may never be injurious, but may conduce to Thy glory, and the good of souls."

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### EXTENT OF GAS-LIGHTING IN LONDON.

THE first attempt to introduce gas-lights into the Metropolis, was made in the year 1807, when Pall Mall was lighted. The progress of this admirable system was at first slow, but has been, of late years, so rapid, that the present consumption of gas, in and near London, requires an annual supply of 200,000 chaldrons of coal; the enormous quantity of 7,000,000 cubic feet of gas being distributed every twenty-four hours, through nearly 600 miles of iron pipes: giving a light in the streets and buildings where it is used, equal to that which would be obtained from 300,000lbs. of candles.

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### REGARD TO CHRIST.

THE unitarian and socinian, who deny or explain away the peculiar doctrines of the gospel, may be allowed to talk of these grand truths with little emotion; but in those who profess a sincere belief in them, such coldness is insupportable. The greatest possible services of man to man, must appear contemptible when compared with the unspeakable mercies of Christ: mercies so dearly bought, so freely bestowed; a deliverance from eternal misery, the gift of a "crown of glory, that fadeth not away." Yet what judgment should we form of such conduct as is here censured in the case of any one who had received some signal services from a fellow-creature? True love is an ardent and active principle: a cold, a dormant, a phlegmatic gratitude, are contradictions in terms. When these generous affections really exist in us in vigour, are we not ever fond of dwelling on the value, and enumerating the merits of our benefactor? How are we moved when any thing is asserted to his disparagement! How do we delight to tell of his kindness! With what pious care do we preserve any memorial of him which we may happen to possess! How gladly do we seize any opportunity of rendering to him, or to those who are dear to him, any little good offices, which, though in themselves of small intrinsic worth, may testify the sincerity of our thankfulness! The very mention of his name will cheer the heart, and light up the countenance. And if he be now no more, and if he had made it his dying request, that, in a way of his own appointment, we would occasionally meet, to keep the memory of this person, and of his services in lively exercise, how should we resent the idea of failing in the performance of so sacred an obligation!—*Wilberforce.*

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### THE POWER OF GOD.

THE Thracians had a very striking emblem, expressive of the almighty power of the Deity. It was a sun with three beams—one shining upon a sea of ice, and dissolving it; another upon a rock, and melting it; and a third upon a dead man, and putting life into him. How admirably may all this be used to illustrate the gospel, which an inspired apostle calls, "*the power of God* unto salvation to every one that believeth it!" It melts the hardest heart into uniform obedience to the Divine will, and raises those who were dead in trespasses and sins to a life of righteousness.

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THE

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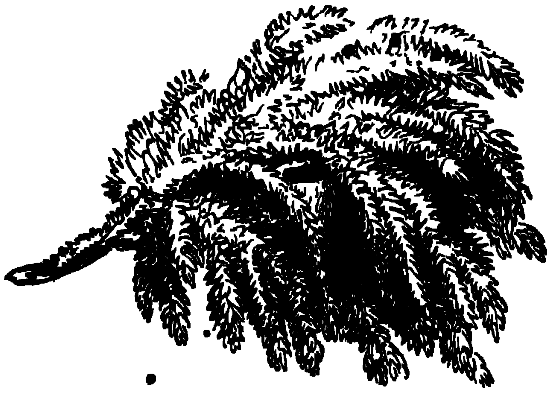
THE GOLDEN-CRESTED WREN.



NEST OF THE GOLDEN-CRESTED WREN.
(*Regulus auricapillus* Selby.)

WE have given above a sketch from nature of the nest of that most beautiful little bird, the golden-crested wren, (*regulus auricapillus.* Selby.) It is a nearly globular mass, compacted of moss and lichen externally, and lined with a thick bed of feathers, having a very small entrance at the top, but proportioned to the size of the internal cavity, which bears no relation to the magnitude of the whole, owing to the thickness of the mossy walls. The weaving of this substantial nest must have been a work of great labour and assiduity, for, compared to the bulk of the diminutive architects, it is of large dimensions, the circumference being eleven inches, while the bird itself is but three inches and three quarters in length.

The situation of this nest is not the least interesting part for consideration. It is suspended on the under-surface of a firbranch, thickly clothed with foliage, by which it is almost entirely concealed, and quite protected from the rain. Thus, beneath a natural canopy, this little bird rears her diminutive brood, whose cradle swings to and fro with every breeze, yet is safe from the pelting of the storm. Such is the situation usually adopted; and the fir-tree is that to which preference is given; but in failure of the fir-tree, the nest has been observed suspended from the small branch of an oak, or attached to the underside of the bough of a cedar or yew. The eggs are from seven to ten in number, and of a pale yellowish brown.

The following anecdote, in "Montague's Dictionary of Ornithology," may not be here out of place. A pair of golden-crested wrens (observes the writer) having taken possession of a fir-tree in the garden, "I thought it a favourable opportunity to become acquainted with some of the manners of this minute species, and to endeavour to discover whether the male ever sung by way of instructing the young ones. Accordingly, I took the nest when the young were about six days old, placed it in a small basket, and by degrees enticed the old ones to my study window; and after they became familiar with that situation, the basket was placed within the window, then at the opposite side of the room. It is remarkable, that although the female seemed regardless of danger, from her affection to her young, the male never once entered within the room; and yet would constantly feed them while they remained at the outside of the window: on the contrary, the female would feed them at the table at which I sat, and even when I held the nest in my hand, provided I remained motionless. But on moving my head one day while she was on the edge of the nest, which I held in my hand, she made a precipitate retreat, mistook the open part of the window, knocked herself against the glass, and lay breathless on the floor for some time. However, recovering a little, she made her escape, and in about an hour after, I was agreeably surprised by her return; and she would afterwards frequently feed the young while I held the nest in my hand. The male-bird constantly attended the female in her flight to and fro, but never ventured within the window frame; nor did he latterly ever appear with food in his bill. He never uttered any note but when the female was out of sight, and then only a small chirp. At first there were ten young in the nest, but, probably for want of the male's assistance in providing food, two died. The visits of the female were generally repeated in the space of a minute and a half or two minutes, or, upon an average, thirty-six times in an hour; and this continued full sixteen hours in a day, which, if equally divided between the eight young ones, each would receive seventy-two feeds in the day; the whole amounting to 576."

We need hardly observe that insects and their larvæ constitute the food: these it seeks for, much in the same manner as the well known Blue Tit, (*Parus cœruleus*,) searching with great activity among the leaves and buds of trees, and the crevices of the bark.

Though the smallest of our British birds, the golden-crested wren is hardy and vigorous, and braves the winters of our island, united in small flocks, which separate in spring. On the continent, it is abundant in the extensive pine forests of the north, whence it migrates southwards, after the summer is over, unwilling to contend with the severities of winter in those dreary regions. Hence it occasionally happens that the flocks permanently residing in our island, have their numbers increased by multitudes of strangers, which (as happened in October, 1822) suddenly make their appearance on the coast, driven out of their usual course by violent stress of weather, the gale blowing from the north-east.

M.

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## CONTENTMENT THE FRUIT OF FAITH.

> "I have learned, in whatsoever state I am, therewith to be content. I know both how to be abased, and I know how to abound: every where and in all things I am instructed both to be full and to be hungry, both to abound and to suffer need. I can do all things through Christ which strengtheneth me."—Phil. iv. 11—13.

This, then, is a primary duty of every one who belongs to Christ—To be content with the allotments of God's providence, to exercise the graces suitable for prosperity or adversity. It is not superfluous to speak a word on this duty. For ours is a discontented world. Even professing christians are too often a murmuring, fretful, dissatisfied people. I speak not of their complaints of indwelling sin, nor of their dissatisfaction with their slow progress in Divine things. I speak of their being too much like the children of this world, over-anxious for the things of time and sense, careful and troubled about many things, too often peevish, restless, covetous, even as others.

But, brethren, if genuine believers, it

must not be so with you. In giving yourselves up to Christ, you leave all your outward circumstances to his Divine will. You then seek first the kingdom of God and his righteousness, and you depend on him to fulfil his own promise, that all these things, food, raiment, necessaries for this life, shall be added unto you, Matt. vi. 33. You will still use diligence, prudence, activity, in worldly duties; but you will cheerfully leave the measure of your worldly prosperity with God. Does he prosper you in worldly things? You will know how to abound; which is no easy thing; how to use abundance with holy moderation, to be temperate in all things, to employ wealth, influence, station, not to gratify pride and ostentation, but as faithful stewards for Jesus Christ. There is, according to the Bible, much cause to fear for rich and prosperous christians: see Matt. xix. 23, 24; Luke xii. 16; xvi. 19; James v. 1; Rev. vi. 15—17. There is such danger, lest riches should be turned into golden chains to fetter down the soul to earth; lest they should pamper pride, nourish sensuality, and minister to the natural selfishness of the heart, that it is, perhaps, a merciful dispensation, that the majority of God's people, in every age, have been comparatively poor. Yet the rich may learn—Christ can teach them—how to abound and to be full, not only without sin, but in such a manner as to glorify God. The way is simply this—They are to consider all they have as belonging to Jesus Christ, and therefore to be employed, wisely and discreetly, yet cheerfully and liberally, in his service. They will still provide for themselves and for their families; for Christ tells them to do so: "If any one provide not for his own, and specially for those of his own house, he hath denied the faith, and is worse than an infidel," 1 Tim. v. 8. But they will not make prudence a cloak for covetousness; they will be content with a moderate provision for themselves and theirs, and the remainder will be lent to the Lord, to feed the hungry, clothe the naked, teach the ignorant, relieve distress, and send the gospel of Christ throughout a perishing world. So also with influence; prosperity commonly gives a man a wider sphere of usefulness, and a more commanding position for doing good. Where much is given, much will be required. A city set on a hill cannot be hid, Matt. v. 14. Prosperous christians, receive the word of exhortation. Your example, words, actions, have a continual bearing on society. Let them all give a consistent, grateful testimony for Christ. "Let your light so shine before men, that they may see your good works, and glorify your Father which is in heaven," Matt. v. 16.

But, reader, is adversity or poverty your lot? Then, with the apostle, you will know "how to be abased, how to be hungry, and suffer need," in a manner becoming a christian. You will resort to no unlawful means of supplying your wants. A christian had rather dig than beg, rather beg than defraud, rather starve than steal. But more than this: no hard thought of God will fill your mind: no pining anxieties will fret your spirit. You will think with yourself thus:—I certainly have given myself to Christ: it seems his will, that I should be poor as to this world's goods. Well: be it so! He gives me no worse condition than what he took himself. He had not where to lay his head, yet he gives me a cottage or a room, and deigns to hallow it with his gracious presence. If I know hunger and thirst, so did he and his apostles. If I have not the benefit of great riches, I, at least, have not their responsibility. Though I get on but roughly, God helps me forward; and then, the riches of Christ, the bread of life, the new wine of consolation, the hope of glory,—these are mine for every day's use. The poor christian passes a fine mansion; he need not covet. I have a better mansion than that, he may say, "even a house not made with hands, eternal in the heavens," 2 Cor. v. 1. Does a splendid equipage roll by? He need not envy. The Lord, who walked with the disciples to Emmaus, honours him with his converse. He can pray for the rich and great, that they also may have fellowship with Christ. At another time, trains of servants sweep along: I have more glorious attendants; are not the angels all ministering spirits, sent forth to minister to them who shall be heirs of salvation? Heb. i.14. Does one pass, clad in gay attire? My soul, thou needest not envy. Hast thou not robes made white in the blood of the Lamb, garments of praise, a mantle of salvation?

And then, if your means be ever so scanty, and if you have ever so little of this world's goods, you may yet do something for Christ with that little. Remember the widow's mite. Let not the one talent be wrapped in a napkin. Imitate her, of whom the Lord said, "She hath done what she could," Mark xiv. 8.—*Hambleton.*

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PASTORAL RECOLLECTIONS OF E. B.

E. B. was a young man of an inquisitive mind, and fond of reading. I had known him for some time as one of my hearers, and had frequently remarked that he was one of the most attentive. His countenance occasionally indicated deep feelings, and the tear that started from his eye indicated that those feelings were of a penitential kind. I was not, therefore, surprised, when a mutual friend informed me, that he was deeply anxious about spiritual things. It was what I had supposed from his appearance in the house of God. On inquiry, I found his habits had undergone an important change. He had become thoughtful and inquiring; a reader of the Bible, and a companion of them that feared God. In his family, (for he was a husband and a father,) this change was most visible. Family prayer was established, and the solemn truths of religion became the subjects of conversation in his domestic circle. As I was in the habit of setting apart one evening in the week for the purpose of meeting such of my hearers as were solicitous for my advice, I invited him to my house. His visits were renewed weekly for some months, and I shall never forget the anxiety and earnestness with which he requested advice. I found him to be labouring under deep conviction of sin, with a most depressing apprehension that he should relapse into his former coldness and negligence. In such cases, I have ever made it a rule, not hastily to administer the consolations of the gospel. I would not think uncharitably of any of my brethren, but I have sometimes feared they are occasionally injudicious in the treatment of such cases. The first prompting of one's benevolence is to allay anxiety, to relieve, in a word, from present suffering. It is eminently pleasing to give the "oil of joy for mourning, the garments of praise for the spirit of heaviness:" but, if this be done before the state of the heart has been ascertained, the consequence will be, a partial abasement before God, and a want of that decision and energy which forms such an important feature of the christian character. I therefore endeavoured to probe the disease under which E. B. laboured, to ascertain the nature and extent of his convictions, and to learn its influence on the general sentiments and habits of his heart. My object was to impress very deeply on him the fact, that however pungently he might grieve on account of sin, he yet knew but little of its heinousness, and felt but little of the sorrow it should induce. I was increasingly pleased with his state of mind. He was frank in his communications, and received with kindness the advice I gave. His views became more settled, and he appeared to rest in the faith of the gospel. He had been the subject of religious impressions before, but they had gradually worn off, and this gave rise to distressing apprehensions that they would do so again. I directed him to the promises of God, assuring him, if he confided in their faithfulness, and asked their performance, he would be kept from backsliding.

Just at this period he removed from my neighbourhood, and I saw and heard but little of him for several months. At length he returned, but a change had passed upon him which I was distressed to witness. His visits to me were not renewed, and his attendance at the house of God became less and less frequent. I called frequently at his dwelling; he was respectful and kind, but there was an obvious effort to prevent the introduction of religious topics. His whole manner was uneasy and embarrassed, and I awoke to the painful consciousness that my hopes were disappointed. The charm of our intercourse was gone; the tie which had united us was broken, and I at length reluctantly discontinued my visits.

I inquired respecting him from time to time, and I found the sabbath was profaned, the house of God abandoned, and the word of truth regarded as a lie. He had become an infidel, or rather a sceptic. I cannot describe my feelings on the reception of this intelligence. I recalled the past, I remembered my anticipations of the future, and trembled at the thought of the mental agony to which he would awake when the season of his delusion had passed. I was satisfied he knew too much of religion, and had felt too much of its power, to be easy in his present state. It was necessary he should retrace his steps, or he must plunge deeper into the mazes of a spurious philosophy, in his efforts to obtain peace of mind. Those only who have passed from the regions of christianity to those of unbelief, can form an adequate conception of the perplexity and self-reproach which accompany the transition.

A considerable period elapsed before I again heard of my friend, when I was greatly surprised by receiving a communication from him, earnestly requesting me to specify the earliest convenient hour when he would see me. I gladly complied with his request, and those only who have been placed in similar circumstances can tell what my emotions were, when I saw him again enter my study. His countenance told me the errand on which he came. There is a language in the eye which needs no interpreter.

I soon found that the religious impressions of E. B. were re-produced. He had been uneasy from the moment of his declension; his heart had experienced a fearful conflict. The principles of light and darkness, of good and evil, had struggled for the ascendancy, and now he wept as he thought of his foolishness, and his heart was full of gratitude to his merciful Preserver. There is an indescribable interest, to my mind, in the movements of a penitent just awaking to the consciousness of its guilt and danger. Its humility and penitence, its apprehension of danger, and thankfulness for proffered mercy; the depth of its abasement, the purity of its peace, the elevation of its joy, are amongst the most absorbing objects of human contemplation.

After replying to the many and anxious inquiries of my visitor, I asked him if he could remember the circumstances which marked his transition from religious anxiety to the coldness and neglect of scepticism. I did not want to pry into those secrets of his moral history, which are fit only to be confessed to God, but to ascertain the leading influence which had so fatally led him astray. He told me that the fact of his visiting me had become known to some with whom he was partially acquainted, and that one of these, a religious man, had, in consequence, invited him to spend an evening at his house. "I went," said he, "full of expectations and desire, not doubting that I should hear something that would prove useful to my soul. I found many religious persons assembled, and felt that the only reason why I was among them, was their knowledge of my spiritual anxieties. They talked on various subjects, the occurrences of the day, the changes of the political world, the talents of different ministers, and the interests of their several religious communities; but not one word was dropped which could afford guidance to an inquiring, or solace to a wounded heart. I came away disappointed and chagrined. My heart was chilled, and the thought came across me with a power I shall never forget, that religion, after all, was but a fiction." Such was the account he gave me; and it sank deeply into my heart. He has since made a profession of christianity, and is now walking, I hope, in the truth.

Reader dost thou bear the christian name? Take heed, that thy neglect of duty does not put a stumbling-block in the way of others.

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## MEDICAL PROPERTIES OF RANUNCULACEOUS PLANTS.

It has been already intimated, in our paper upon the Ranunculaceæ, that the plants of this order, or family, possess active, if not poisonous qualities. It might, therefore, be asked by some, what profit or delight can be found among poisons? To this it might be answered, that many substances, long used in medicine, would prove fatal, if given indiscriminately, or in large doses; but, when administered with judgment, in suitable proportions, they become highly efficacious. Few would be tempted to seek for physic where danger seems to lie in ambush to surprise; nor would we encourage any person to think that he can find the means of health and cure in the fields, unless he has a scientific and experimental knowledge of the human constitution. Our object is, to furnish a few statements for the instruction of the general reader, and to point out fresh instances of the goodness and wisdom of the Creator. There is something very delightful, when we take a turn in the fields, in being able not only to recognise by name the various objects which flourish in the sun-beams, but also to recite to ourselves, or to others, some particulars about their history. It is the aim of these papers to afford materials for such desirable information; and, in order to secure that object the more effectually, we shall couple our observations upon the properties of plants with allusions to marks by which they are distinguished, and the places where they may be found.

*Ranunculus*, or Crow-foot.—The various species of this genus agree pretty nearly in the intensity of their acrid and corroding properties. The round-leaved water-crow-foot, distinguished by its pale green and glistening leaves, (*Ranunculus Sceleratus*,) deserves a separate notice, for the pounded leaves have been tried as a substitute for blister-salve, and have been found to contain all the vesicating or blistering effects of that application, without any of the ill consequences which are apt to attend it. Several other species, growing in watery places, were for many centuries used for the purpose of reducing granulated flesh in ill-conditioned wounds, and for dispersing the collected matter in boils and imposthumes. To this end the pounded leaves were mixed with lard, and laid upon the part affected. Care, however, was necessary, since this appliance executed its task with so much alacrity, lest it should do more than was assigned it. Laguna, a physician of Salamanca, after saying that all the species of Ranunculus are extremely hot and biting, caustic, and very corrosive, adds, that no person ought even to taste or apply them to the surface of the body. And Apuleius tells his reader, that if he wishes to put the acrimony of the scelerata, under which term several species of water crow-foot were included, to the proof, he might do it by tying a bruised piece of leaf to the healthy part of his hand, when he would find that it began immediately to corrode the skin. The Sardonic laugh of antiquity was, it seems, produced by eating a plant of this genus, which was, perhaps, no other than the Persian, or garden ranunculus, which has been so long an object of attention and delight among our curious florists. It was found by Dr. Sibthorp growing plentifully in the island of Cyprus, where it is called Wild Parsley. The Spanish writer quoted above, says, it grows very copiously in Sardinia. The terms Ranunculus and Batrachium denote a little frog, and seem to have been given to these plants from a fancied resemblance which their leaves have to the foot of a frog. We call the butter-cup crow-foot, from an imaginary likeness which the leaves have to the claws of that bird.

*Delphinium Staphisagria*, Stavesacre.—The stavesacre is of the same genus as our common garden larkspur, which is familiar to every one who has looked but a little into our rural improvements. It resembles the larkspur in appearance, and is found growing wild in the southern parts of Europe. It is a handsome plant, though less beautiful than some of its relatives, the larkspurs. The medical use is confined to the seeds, which have been used as a masticatory; for, on being chewed, they excite a copious flow of saliva, allay the toothache, and relieve other painful disorders of the face. But relief is thus sought at great risk, for Schultz, by only keeping them in his mouth a few minutes, to assuage the toothache, was, for a time, deprived of his senses. It is related, that a dog, by taking five scruples, or less than a quarter of an ounce of its seeds, became convulsed, and died soon after. Its dangerous qualities have precluded its internal use; it is, therefore, only applied to the surface of the body, where it proves efficacious in the cure of cutaneous eruptions. If a small quantity of the powder be sprinkled upon the hair, it becomes fatal to a certain little parasitic, which, amongst filthy people, is apt to thrive and propagate its kind in that situation; whence it is called louse-wort. Those who use it for this purpose, should remember that they are dealing with a poison, and, therefore, shape their caution accordingly. The whole seeds are not generally kept by chemists, though the powder may be met with in larger shops.

*Aconitum napellus*, monkshood.—We conclude by mentioning this common garden flower, merely for the purpose of cautioning parents against it. For it is not only baneful when eaten, but even the vapour or smell arising from it, is said to have produced in children playing near it, all the fearful symptoms of poison. We cannot vouch for the fact ourselves, but to us the statement seems worthy of credit, and ought to put us on our guard, lest our little ones should cultivate too free an acquaintance with a plant so much to be avoided. As those minute particles which affect the organs of smell, cannot be seen by the eye, we are not always sufficiently apprised of their active properties. But when we happen to be closeted with a powerful odour, in a narrow room, as a ship's cabin, we then find to our cost, that smells, even when agreeable in open air, are by no means harmless things. When the writer was living in the Sandwich Islands, his servant dressed up the room one afternoon, in a very tasteful manner, with a native sweet-smelling evergreen, called maire. About four o'clock in the morning the sleepers were awakened by the agonizing feelings of intense pain and sickness, and imagined they felt all the frightful effects of poison. The cause of all this was instantly guessed at; and the pretty garniture which had given the servant so much gratification in displaying, was dismounted without ceremony, and thrown out of the window. The sashes remained up long enough to renew the confined air of the room, and they lay down and waked after a few hours, feeling as if nothing amiss had befallen them.

## OLD HUMPHREY ON HOUSEWIFERY.

Never am I put out of temper without sinking in my own estimation; but, notwithstanding this deserved punishment, it too often occurs, in spite of all my attempts to the contrary, that my stock of patience is exhausted, and I am angry. Willingly would I be employed, from the crowing of the cock to sunset, in speaking in praise of what is estimable, rather than in censuring what is faulty; but, ever and anon, circumstances occur that require more than the forbearance that Old Humphrey possesses, to put up with them without a reproof.

Mistresses of families, I have a word to whisper in your ear.

The duties of a well-regulated house are many: some of these occur every day, and others at periods more remote from each other. Among the latter, there is one that requires considerable address. Most families have occasional visitors, that pass a few days and nights with their friends, in a sociable way, and then take their leave. Now it is respecting the duties you have to attend to, when you have a visitor in the house, that I wish to speak. I will not indulge in a wearisome exhortation, but merely mention the circumstances of a late visit of my own, from which I do trust you will contrive to extract a hint or two that may be useful.

Weary and worn, I arrived at the house of a friend, and was received in the most hospitable manner; I felt that I was welcome. But though the wife of my friend had many excellent qualities, she was sadly deficient in some departments of good housewifery: she did not know how to make a visitor comfortable. At my time of life a little attention is absolutely necessary to my peace. I like to feel that there are those around me who are mindful of my comfort. We all have our little whims and peculiarities, and I have mine. A little attention wins me over directly, while the want of it sadly disturbs my accustomed serenity.

Soon after my arrival, I was shown into an up-stairs chamber, that I might wash my hands and-face, adjust my cravat, and pass an opening comb through my few remaining grey hairs. And here I heaved a sigh at the want of good housewifery on the part of my hospitable hostess. A piece of soap lay soaking in dirty water in the wash-hand basin; a dirty towel lay on the dressing table; and dirty shoes, slippers, and clothing of different kinds, occupied the chairs and floor at the far end of the room. The looking-glass was so dusty that I wrote my initials on it with my finger, to render any other admonition unnecessary Now, why could not the good lady of the house have given a glance round the room before I was shown into it?

I must acknowledge that I felt far from happy; but, "Come, come," said I to myself, "the best housewives are sometimes a little negligent. I am an unexpected visitor, and must not expect to find things so orderly as if they had looked for me."

The day passed, and the night came, and once more I was shown into the chamber, which had then undergone considerable alteration. The slippers and the clothing had been poked all together into a closet, the door of which was left half open. An attempt had evidently been made to wipe the dust off the looking-glass, for only a very small part of my initials could be seen upon it. The dirty water had been emptied out of the wash-hand basin, and a clean towel hung on the small clothes-horse. So far, so good; and I congratulated myself accordingly.

Aged people generally attach a great deal of importance to a good night's rest. It is so wearisome to lie, hour after hour, listening to the ticking of a watch, or to the clock as it lazily strikes the slow-footed hours. For my own part, perhaps I am a little too particular in my preparation for the night's repose. A good long night-gown, and a comfortable, clean, warm night-cap are indispensable. Alas! alas! neither night-gown nor night-cap were placed in my chamber for my accommodation. Now why could not my kind-hearted hostess have seen that these things were provided for her aged visitor? "Well," said I, "a happy turn of mind will make the best of every thing; with a little management I shall do very well;" so, tying my silk handkerchief around my brows, I looked forward, being very weary, to a hearty slumber. Turning first on one side, then on the other, I wrapped the bed-clothes around me, drew up my feet, and tried all sorts of contrivances, but in vain; the night was cold, and the blankets scanty, and it was not till I had spread my coat over the bed that I felt comfortable.

I was sure that the good mistress of the house did not mean to neglect me, but it would have been thoughtful of her to have seen that I had an extra blanket.

Bright were the sunbeams that welcomed me, when, on the morrow, I drew up my window-blind, and approached the wash-hand stand to begin my ablutions. By some strange mishap, no water had been put for me; so, opening my chamber door, I called aloud to Sally, who came running, with a face ruddy with health, and lighted up with good humour, to my assistance. No sooner did Sally know what I wanted, than down stairs went the willing but thoughtless girl to supply my wants; this she did with so much good humour, that I heartily forgave her, or rather her mistress, for the neglect. I now prepared to wash in good earnest, but not a morsel of soap could I lay my hands on. Once more Sally was summoned, and once more did she disarm me by her ready alacrity to do my bidding. "Sally! Sally!" said I, "I have got no soap: and, stop a moment," for the girl was off like a shot, "you may as well bring me a little spring water to wash my mouth with, for I do not see any on the table." Sally was "very sorry," and winged her way down the stairs so nimbly, that the soap and the spring water were soon forthcoming. When I took up the water-bottle, however, to pour a little water into the glass, no glass was to be found. I used the bottle without a glass, managing matters as well as I could. "Surely, surely," thought I, "mine is a chapter of accidents; the lady of the household cannot always be so forgetful of her friends!" Breakfast passed off very well, but when I wanted my great-coat and shoes, neither the one nor the other had been brushed. Sally ran off with them to John, who hastily performed his task; but why could not it have been done before? It was not John's fault, nor Sally's fault, but that of their mistress; a good housewife would not have left me to the care of negligent servants. No! she would have seen that they did their duty. One glance of a kind-hearted housewife is of great value to the order and comfort of every dwelling. I did not expect my friend's wife to carry me up water and soap; to prepare me a night-gown and night-cap; to clean my shoes, or to brush my great-coat; but surely it was not unreasonable to expect that she would see these things were done for me!

Mistresses of families, let me tell you a plain truth; I know twenty households, that have worthy beings at the head of them, who seem to have almost every other good quality but that of good housewifery; and for the want of this, comfort, instead of being a stated inmate, is only an occasional guest.

There is a cleanliness, an order, a sprightliness given to the abode of a good housewife, that is absolutely alluring; but, if the chairs are allowed to be all sixes and sevens; the table littered over with work; the fire without fresh coals; the hearth unswept, and the candles unsnuffed, until a domestic attends to them, an air of negligence reigns around, that is forbidding. Many a husband, of a quiet temper, walks away from such a scene, not only seeing, but feeling, how little his happiness is attended to, to seek, in neater and livelier habitations, that comfort which he finds not in his own.

Old Humphrey, from the days of his boyhood, was dependent on these things: an expiring fire, an unswept hearth, an untidy room, and a candle burning in the socket, are all sources of annoyance to him. Come, ye mistresses of families! see if a useful lesson cannot be learned from my remarks.

There is one habitation at which I am an occasional visitor, that presents a pattern of good housewifery. Kind, quiet, and thoughtful, without bustle, and without ostentation; the mistress, by her systematic and persevering attention to her friends, renders her house one of the most comfortable and delightful in the world. All my wants are anticipated; all my peculiarities provided for; so that, whether I go out or come in, I have constantly the feeling that I am cared for. There is no negligent servant in the establishment, and why? because the mistress is a good housewife. She sees that the servants do their duty. She has kindness enough to desire to make her guests happy, and industry sufficient to effect her purpose. Mistresses of families! again I say, listen to the admonitions of Old Humphrey, and be good housewives.

## SEPARATION FROM THE WORLD.

The intercourse of christians with the world should resemble that of angels; who, when they have been sent on messages from heaven, have discharged their duties with the utmost promptitude and haste; and have then joyfully flown back to their home in the presence of Him, whose favour constitutes the whole of their happiness.

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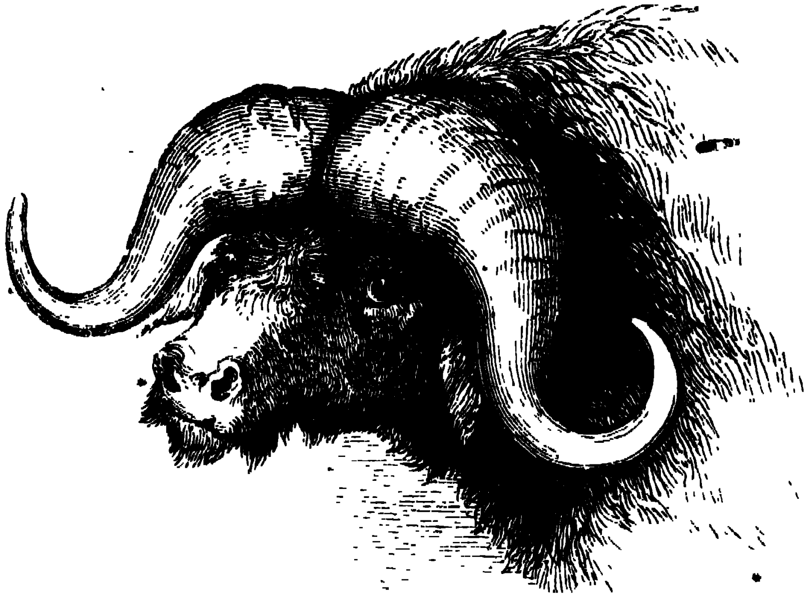

HEAD OF BUFFALO.

## THE BUFFALO OF SOUTH AFRICA.

*(Bos Cafer.)*

EUROPE, Asia, Africa, and America, possess, each their own indigenous wild species of the genus *Bos*, (or that of the ox,)—which have never submitted to the dominion of man. While the domestic ox, of which the wild origin is unknown, the zebu, the common buffalo, and the yack of Tibet, have been reclaimed by his care; these, more untractable in disposition, and more ferocious in temper, have resisted his efforts, and defied his power. The aurochs of Lithuania, the arni, the gour, and the gyal of India; the bison and the musk-ox of North America; and the savage buffalo, of South Africa, have lived free and unfettered by the yoke of servitude.

Of these wild and dangerous natives of the mountains and the wilderness, one of the most remarkable is the buffalo of Africa, (*Bos Cafer.*) It is found in troops, in Southern Africa, but not within the tropical line. The localities it frequents, are the watered glens, and ravines among the hills; and, like the rhinoceros, it is fond of wallowing in the pools or marshes. Most African travellers, from Sparrman to Burchell, have given some account of this remarkable animal, and all agree in describing it as fierce and treacherous. The expression of its countenance is savage, daring, and malevolent, an effect to which the character of the horns not a little contributes. These formidable weapons are so enlarged at their base, that, like an impenetrable mass of iron, they cover the whole of the forehead; they then bend downwards, and somewhat backwards, but are curved upwards at the points. The base is rugged, and the general colour black. Though not much taller than the ox of Europe, the Cape buffalo is much larger in bulk, and more robust in all its proportions. Possessing amazing strength, and no inconsiderable share of fleetness, it tears its way through the thickets, and up the mountain sides, leaving the hunter in the distance, unless, indeed, as is often the case, it commences the aggression, ripping open both horse and man, and trampling their mangled bodies beneath its feet. This formidable species is covered with short black hair, thinly scattered; that on the under lip, and about the corners of the mouth, being elongated so as to form a scanty beard. The ears are large and pendent, the limbs short and thick, the shoulders high and muscular, the tail short and tufted. The hide is so dense as to be almost bullet-proof. When duly prepared, it is in high esteem among the colonists and Hottentots, as it possesses great strength and durability, and is therefore preferred for various purposes, where such qualities are requisite.

Mr. Burchell observes, that the strength, ferocity, and treacherous disposition of the Cape buffalo, "render it dangerous to be attacked without caution, or without the certain means of escape at hand." At Bloem's Fountain, in the country of the Koras, his people roused a lion, a lioness, and her two cubs, together with a buffalo, which latter was chased and shot; of this individual he gives the following account: "The present animal was a male, and apparently not young; as the points of its horns were much worn, and its ears exceedingly torn and cut, probably in forcing its way through the thickets, or in butting and fighting with others of its species. The Hottentots say they are seldom found with ears quite entire; and my own observations confirm the remark. The meat was in taste like coarse beef; but in younger animals it is very palatable and wholesome, and free from any unpleasant flavour."

Powerful and resolute as the buffalo is, it falls a frequent prey to the lion, who, after satiating his appetite, leaves the rest to the hyenas, jackals, and vultures. M.

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## OLD HUMPHREY ON READING.

The other day it happened that, while I was sitting in the midst of a family, with several young people around me, the doctor called, one of the party being a little ailing. Now, the doctor is a friendly man, of good parts, and of a kind-hearted disposition; but very unsound in his religious views, inasmuch as he is guided by his own opinions instead of the scriptural records of eternal truth.

It has often puzzled me how it is that some medical men, who so ardently seek to know, and who understand so much better than others, every thing in reference to the wonderful frame-work of the body, should manifest so much apathy and ignorance respecting the soul. I always liked the society of medical men, but for all that, Old Humphrey is not one that will tickle their ears with pleasant words when he sees an opportunity of touching their hearts with a salutary truth. There are many doctors who are well versed in, and influenced by the holy scriptures, to their own advantage, and to that of their patients; but there are others who think neither of the souls of their patients, nor of their own.

We were speaking of books, and of the great influence they had over the minds of their readers, when the doctor unhesitatingly gave it as his opinion, that young people should be permitted to read what books they pleased, good and bad, without restriction, to enable them to form a correct judgment respecting them.

"Young persons," said he, "who are not allowed to do this, are sure to form very cramped and precise notions."

"Well," thinks I, "the doctor gives his physic to those who want it, and why should not Old Humphrey? A little dose on this occasion cannot hurt the doctor, and if it should do him no good, perhaps it may do some to the young people round me," for they very naturally thought a good deal of what fell from the lips of their medical friend.

"Let us see," said I, "how this principle would work in common life; for my notions, I must confess, are so 'cramped and precise,' that I prefer, as a guide in such matters, the experience of a thoughtful parent, to the inexperience of a thoughtless child. What say you to allow your own children to roam about your own surgery, and to let them taste, without restraint, what they like, to enable them to form a correct judgment respecting them? The first packet might be magnesia, and it might do them good; but if the second happened to be arsenic, which is not very unlike it, they would infallibly be poisoned. If, instead of going to the substances, they went to the liquids, the first phial might have in it tincture of rhubarb, an excellent stomachic, but the second might contain prussic acid, which, if highly concentrated, would inflict immediate death.

"There is a difference between books and the contents of the surgery, certainly, and it is this—that the one is medicine for the body, and the other for the soul. Books and medicines are both influential, and the prussic acid which destroys the life of the body, is not more deadly than the bad books that poison the principles of the soul."

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### THE MARRIAGE SUPPER.

Of the great Teacher who came from God, it is recorded that his very enemies were constrained to say, "Never man spake as he did." There seems to have been something, both in the matter and manner of his teaching, which distinguished it from all others. He delivered much of his doctrine in parables, and among them that of the marriage of the king's son holds a distinguished place. The reader will find it recorded in the 22nd chapter of Matthew, and also in the 14th of Luke. Reader, did you ever examine it? If not, allow me to assist you in doing it.

The parable was originally spoken to the Jews, the people to whom our Saviour was principally sent; among whom he exercised his public ministry, and to whom the first gospel invitation was given; though, unhappily, they set light by them, despised their own mercies, and so counted themselves unworthy of eternal life. Let it not be so with us; let us take warning and profit by their example!

The parable implies, as all our Lord's teaching while on earth did, that all the posterity of Adam are by nature in a guilty, lost, or fallen state; and so the gospel is the rich provision of the God of all grace for their relief, that they may not perish in their sins.

Now, in this beautiful parable, God the Father is represented as the King, whose grace and love are the original spring of all. Jesus Christ is the Son, who is the Bridegroom of his church. The servants are the prophets; John the Baptist, and the apostles; some of whom are sent before, others after, the feast is prepared. The guests invited are, first, the Jews at Jerusalem, then those who were scattered abroad; and lastly us, perishing gentiles. The feast itself is the blessings of the everlasting gospel.

The things provided for this feast, or marriage supper, are set forth under the metaphors of "oxen and fatlings," conformably to the language of the prophets: See Prov. ix. 2; Isa. xxv. 6; and chap. lv. 1, 2. Thus the provisions of the gospel are represented by the choicest and most delicious dainties, marrow and fatness. Here God hath provided, both for himself and sinners, a sumptuous entertainment, at which they may feast together. He hath provided for himself a Lamb for a sacrifice, and one of infinite dignity and value, wherein he rests for ever well-pleased. He invites sinners also to partake of this feast, and be reconciled to him; to receive the free remission of sins, the adoption of children, and to feast abundantly on his love and grace, manifested in, and flowing freely through a crucified Saviour. Here he holds forth himself as their satisfying and everlasting portion; their Father, their God, and their all, in time and through eternity. What a feast is this! it is truly a feast of love!

To induce sinners to come to this feast, the King sends his servants to invite guests, telling them that all things are now ready. Much, indeed, was to be done in making ready this feast: perhaps, reader, you never thought of this. But the law which sinners had broken must be fulfilled; reparation must be made to injured justice, by a complete and adequate atonement for sin; the head of the serpent must be bruised; the world, sin, and death, overcome; an everlasting righteousness brought in, and remission of sins and eternal life procured in a way consistent with all the Divine perfections. But how should all this be effected? What insurmountable difficulties lay in the way of providing this feast! Neither men nor angels could give the least assistance in this preparation. Infinite wisdom, however, contrived it, and boundless love and grace carried it into full effect. To make all things ready, the eternal Word became incarnate, and, in the form of a servant, was obedient to the will of his heavenly Father in the room of the guilty: the Holy One and the Just was made a curse, endured the death of the cross, and that for the sake of sinners: he died, and rose again from the dead, for their justification. Oh, what a feast! how costly to the Father! how costly to the Son! Angels had never such a feast prepared for them! In this feast nothing is wanting to render it complete, nothing left for us to provide, nothing unprepared, nothing left for the guests to pay, except gratitude and praise to the munificent Donor. Every thing becoming his infinite bounty, and every thing suited to our wants; all are provided ready to our hands. "He spared not his own Son, and with Him he freely gives us all things." All is absolutely free, "without money and without price," Isa. lv. 1. But, reader, the invitation demands a speedy compliance; you are among the number invited; beware how you slight the invitation; remember that all things are ready and waiting for your acceptance. Every moment's delay is dangerous, and throws contempt upon the feast and its provider! "Hear, and your soul shall live;" "Believe on the Lord Jesus Christ, and you shall be saved."

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### CHEMISTRY. No. IX.

#### EARTHS.—NO. 2.

THE BERYL, a green, transparent stone, yields, when analyzed, a soft, white powder, which is one of the elementary earths. It is in itself destitute of taste and smell, and adheres to the tongue; properties by which it may be known. From the sweet taste which it imparts to the acids, with which it will combine, it has been termed glucina. This earth will neither harden nor contract by the application of heat. Considering the source from which it is derived, it is not likely to be obtained in sufficient abundance to be of much utility.

YTTRIA is an earth that enters into the composition of two minerals, the gadolinite and the yttro-tantalite, both of which are found in Sweden. When separated from its combinations, it is a white powder, and is remarkable from the circumstance that its specific gravity, which is nearly 5, is greater than any other earth.

BARYTES is obtained from a mineral formerly called ponderous spar, in which it exists in combination with sulphuric acid. It is distinguished by its greyish white colour, porosity, and pungent taste. Its specific gravity is 4. When exposed to the atmosphere, it attracts the vapour which may exist in it, swells, emits heat, and falls into a white powder in the same manner as lime. From the strong affinity it possesses for sulphuric acid, their union is always maintained with great tenacity. It is employed by chemists as a chemical test; it imparts a yellow tinge to flame, forms a good water-colour, and is a deadly poison.

STRONTITES greatly resembles barytes in many of its properties, is of a greyish white colour, and possesses an alkaline taste, but gives a purple colour to flame. It is obtained from a mineral found in a lead-mine at Strontian, in Wales, and, in its combination with sulphuric acid, is by no means uncommon. Neither strontites nor barytes is soluble in water, and in this respect they differ from all the other earths.

LIME is an earth very abundantly found in nearly all parts of the world, though not in its pure state, for it is usually in combination with carbonic acid, with which it forms carbonate of lime. Marble, chalk, and limestone, are carbonates of lime, and differ very little the one from the other in their composition. Either of these three substances, when exposed for some time to a white heat, will part with its carbonic acid, and the remaining substance is lime, usually called quick lime. When thus prepared, lime is of a white colour, of moderate hardness, easily powdered, and remarkable for its burning, as well as somewhat bitter taste. Its specific gravity is 3¼. It has the effect of changing the blue colour of vegetables into green, and is incapable of fusion.

Lime is of frequent service in the arts, and greatly adds to the number of conveniences by which we are surrounded. It is an important ingredient in the cements that are used in building. Lime is also much used as a manure, on account of its property of hastening the putrefaction of all animal and vegetable substances, and of maintaining a moisture sufficient to produce and preserve the growth of plants. To the bleacher, the tanner, and other manufacturers, it is an important substance.

Lime is not unfrequently combined with sulphuric acid, forming sulphate of lime or gypsum. When united with fluoric acid, a fluate of lime, or fluor spar, is produced; when with phosphoric acid, a phosphate of lime, a constituent ingredient in the composition of animal bones. Marble is a mixture of carbonate of lime and clay. Sir Humphrey Davy succeeded in decomposing this earth, as well as some others, and obtained its metallic base, to which he gave the name of calcium.

MAGNESIA, as found in nature, is always united with some acid. Epsom salts is a sulphate of magnesia, that is to say, magnesia combined with sulphuric acid. When pure, it is a soft white substance, with little taste or smell, and is unaffected by the most intense heat. It is extensively employed in medicine; and when calcined, that is, deprived of its moisture by heat, it is an antidote to the poisonous effects of the mineral acids. It has also the useful property of purifying putrid waters.

### THE FUNERAL OF A TEACHER.

IN a letter to Mrs. H. More, at that time in London, dated Aug. 18, 1795, one of her sisters says:—

"I took my letter yesterday, to finish it at Cheddar; but alas! hurry, grief, and agitation, render it almost impossible for me to write a word; however, I will endeavour to convey to you, that we have just deposited the remains of our excellent Mrs. Baber, to mingle with her kindred dust. Who else has ever been so attended or followed to the grave? Of the hundreds who attended, all had some token of mourning in their dress. All the black gowns in the village were to be seen, and those who had none, had, some broad, some little bits of narrow black ribbon, such as their few pence could provide. The house, the garden, the place before the door, was full. But how shall I describe it?—not one single voice or step was heard—their very silence was dreadful; but it was not the least affecting part to see their poor little ragged pocket handkerchiefs, not half sufficient to dry their tears. Some had none; and those tears that did not fall to the ground, they wiped off with some part of their dress. When the procession moved off, Mr. Boak, (the minister,) who was so good as to come to the very house, walked before the corpse, with his hat-band and gown on; then the body; then her sister, and myself, as chief-mourners; then the gentry, two and two; next, the children, near two hundred; then all the parish in the same order; and though the stones were rugged, you did not hear a single footstep. When we came to the outer gate of the churchyard, where all the people used to pay their duty to her by bows and courtesies, we were obliged to halt, for Mr. Boak to go in and put his surplice on, to receive the corpse with the usual texts. This was almost too much for every one, and Mr. Boak's voice was nearly lost when he came to, 'I know that my Redeemer liveth;' he could scarcely utter it; but to feel it was much better. On our entrance into the church, the little remaining light we had left, discovered to us that it was almost full. How we were to be disposed of, I could not tell. I took my old seat with the children close by her place. Mr. Boak gave us a discourse of thirty-five minutes, entirely on the subject. His text was from St. John. "Where I am, there shall also my servant be." He said, he chose it because it was the last she made use of to him; he added, she looked round her, and observed, it was comfortable to have kind friends, but much better to have God with one! The sermon was affecting and bold, and he said, with energy in his voice, and firmness in his look, 'This eminent christian first taught salvation in Cheddar!' He was very tender in his address to the children, and concluded with a suitable prayer.

"When we drew near to the grave, and the last solemn rite was performed, every body threw in their nosegays. I was almost choked. If you could for a moment doubt my account, I would add, that the undertaker from Bristol wept like a child, and confessed, that without payment, it was worth going a hundred miles to see such a sight. Here were no violent expressions of grief, for the deceased had taught them how to select suitable texts for such occasions, and when to apply the promises of scripture. I think almost tears enough were shed to lay the dust. We returned, and when we joined the children in the great room, and missed her lively, sprightly figure and movements, every heart sank." H.

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## COMBINATIONS.

The effects arising from combinations amongst workmen are almost always injurious to the parties themselves. There are numerous instances in which the public suffer by increased price at the moment, but are ultimately gainers from the permanent reduction which results; whilst, on the other hand, the improvements which are often made in machinery in consequence of "a strike amongst the workmen," most frequently do injury, of greater or less duration, to that particular class which gave rise to them. As the injury to the men and to their families is almost always more serious than that which affects their employers, it is of the utmost importance to the comfort and happiness of the former class, that they should themselves entertain sound views upon this question. For this purpose a few illustrations of the principle here maintained, will probably have greater weight than any reasoning of a more general nature, though drawn from admitted principles of political economy. There is a process in the manufacture of gun-barrels, for making what, in the language of the trade, are called *skelps*. The *skelp* is a piece or bar of iron, about three feet long, and four inches wide, but thicker and broader at one end than at the other. The barrel of a musket is formed by forging out such pieces to the proper dimensions, and then folding or bending them into a cylindrical form, until the edges overlap, so that they can be welded together.

About twenty years ago, the workmen

employed at a very extensive factory in forging skelps out of bar-iron, "struck" for an advance of wages; and as their demands were very exorbitant, they were not immediately complied with. In the mean time, the superintendent of the establishment directed his attention to the subject, and it occurred to him, that if the circumference of the rollers, between which the bar of iron was rolled, were to be made equal to the length of a skelp, and if the groove in which the iron was compressed, instead of being of the same width and depth throughout, were cut gradually deeper and deeper, from some point in the rollers, until it returned to the same point, then the bar-iron passing between such rollers would have a corresponding form, that is, gradually increasing in thickness from one end to the other. On making the trial, it was found to succeed perfectly; and a great reduction of human labour was effected by the process; and the workmen who had acquired a peculiar skill in forging the skelps, ceased to derive any advantage from their dexterity.

It is somewhat singular that another and a still more remarkable instance of the effect of combinations among workmen should have occurred but a few years since in the same trade. The process of welding the skelps, so as to convert them into gun-barrels, required much skill, and after the termination of the war, the demand for muskets having greatly diminished, the number of persons employed in making them was very much reduced. This circumstance rendered combination more easy; and upon one occasion, when a contract had been entered into for a considerable supply to be delivered on a fixed day, the men all struck for such an advance of wages as would have caused the completion of the contract to be attended with a very heavy loss. In this difficulty, the contractors resorted to a mode of welding the gun-barrel, for which a patent had been taken out by one of their number some years prior to this event. The plan had not then succeeded so well as to come into general use, in consequence of the cheapness of the usual mode of welding by hand-labour, combined with some other difficulties with which the patentee had to contend. But the stimulus produced by the combination of workmen, induced him to make new trials, which were attended with so much success, that he was enabled to introduce such a facility in welding gun-barrels by rollers, and such perfection in the work itself, that, in all probability, very few will in future be welded by hand-labour. The process consisted in folding a bar of iron, about a foot long, into the form of a cylinder, with the edges a little overlapping. It was then placed in a furnace, and being taken out when raised to a melting heat, a triblet, or cylinder of iron, was placed in it, and the whole was passed quickly through a pair of rollers. The effect of this was, that the welding was performed in a single heating, and the remainder of the elongation necessary for extending the skelps to the length of the musket-barrel, was performed in a similar, but a lower temperature. The workmen who had combined, were, of course, no longer wanted, and instead of benefiting themselves by their combination, they were reduced permanently, by this improvement in the art, to a much lower rate of wages: for as the process of welding gun-barrels by hand required peculiar skill and considerable experience, they had hitherto been in the habit of earning much higher wages than other workmen of the same class. On the other hand, the new method was far less injurious to the texture of the iron, which was now exposed only once, instead of three or four times, to the welding heat; so that the public derived advantage from the superiority, as well as from the economy of the process.

The same process has been extended to all other kinds of iron tubes, which has so reduced their price, that the employment of them has become very general. They are now, consequently, to be found in the shops of all our larger ironmongers, of various length and diameter, with screws cut at each end, and are in constant use for the conveyance of gas for lighting, or of water for warming our houses.

In the above instances cited by Mr. Babbage, in his book on "The Economy of Machinery and Manufactures," we see that of three parties, the public, the masters, and the workmen, two were materially advantaged by the effect of combination, to the loss of the third. If the untoward results of combinations be felt most where they can be least endured, surely it is the interest of every prudent artisan to think twice before he indirectly furnishes the means of injuring his own circumstances.

### A HINT FROM EXPERIENCE.

THE terms by which the idea of preaching the gospel is impressed and accompanied in the New Testament, imply that it is the promulgation of law, the issuing of an edict, or the publication of some notice which it concerns all men to know. Let the man who spends the six days in business, and the seventh in the pursuit of pleasure, ask himself if he can spare a moment for the consideration of any thing beyond this life, whether he ever gave himself any trouble in attempting to understand its purport, or to find out the person to whom it applies. In the extenuation of many sins a man might perhaps be allowed to plead the acknowledged infirmity of human nature, the influence of bad customs, the deficiency or wrong bias of his education; but what pretext, what excuse, with the slightest colour of plausibility, will he be able to allege at the bar of Divine justice, for having slighted, with an air of self-satisfied pride, contumely, or indifference, a gracious message from the King of heaven, delivered to us by his own Son, who, to seal his exceeding great love, took upon him our nature, and became "a man of sorrows and acquainted with grief," and died the accursed death of the cross?

Fellow-sinner, suffer the word of exhortation from one who, in looking back upon the devious turns and windings of a thorny life, is often visited with the most afflicting sentiments of regret, of remorse, but who sorrows for nothing so much as for the habit of thinking that God was too much taken up in managing the vast machine of the universe, or too justly offended, to listen with compassion to the prayers, or to feel interest in the concernments of one who had so often neglected his precepts, and set at nought all his reproofs. It pleased God to bring him within sight of those awful regions where brooding darkness for ever abides, and there to give him a pledge of his love by conducting him in safety back again. Since that time he has made trial of God's faithfulness, and has found, amidst the conflicts of this life, that it may be trusted, and that every day shows the benefit of reliance on his promises, and devotedness to his service.

If a young man would avoid those evil courses wherein many are wont to lay up such a stock of bitterness for old age; if he would escape from the snares of some who seek to gratify their selfish or malignant propensities, by the embarrassments of unpractised youth; if he would see the plots and schemes of those overthrown who are contriving to oppose his advancement in life or reputation, let him call upon God, and seek to know him, and Jesus Christ, whom he hath sent. Let him be a diligent, a thoughtful, and a persevering student of the holy scriptures. The same Jehovah who gave his servants the wisdom to indite this revelation of himself, will grant him the wisdom to understand it. And though the sneers of the scoffer may appear too keen to be borne, the opposition of circumstances too strong and peculiar to be overcome; and, what is worse than all, though the heart is always too cowardly and faithless to be trusted—yet if we make resort unto God, by reading and prayer, he will by his Spirit fortify the heart with inward strength, remove impediments that appeared insurmountable, and soften asperities which, when viewed from a distance, seemed insupportable.

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### HINT ON DRESS.

Infants on whom, in fact, nature has put no constraint, and whom she has indeed inspired with that kind of restlessness which creates an abhorrence to quiet and restraint, are so bound up by their nurses, almost similar to the mode observed in China, that they have not the proper use of their limbs. To me it appears perfectly obvious that the great desire implanted in all young animals to run, bound, and frisk, has not been given in vain, by the great Creator of all instincts; and that the free, muscular movements of the infant, unquestionably give ease and flexibility, if not strength, to the exertions of the man, and perhaps such motions convey to him the first ideas of existence. That they must be a source of much valuable knowledge cannot be doubted; and thus an absurd custom, which is merely adopted to save idle nurses a little trouble, tends to impoverish both the minds and bodies of a whole generation. This leads me to think that the peculiar strength, proportion, and agility I have often had occasion to observe in the East, particularly among the Turks, is in a peculiar degree to be attributed to the looseness of dress which is adopted from the moment of their existence. It contributes much to the rapidity of growth, and no attempt is made, like as in other nations, to screw or dandify the body into any state, with the absurd idea of improving the shape, thus obstructing the grand organs of life: on the contrary, they study that these shall be under no kind of restriction, but have the fullest play; and it may be added as a fact, that it rarely occurs that a Turk is afflicted with corns. The habits they wear do not fetter any one part of the limbs, but allow the whole body to assume its natural play; in one word, it is in the Eastern world that man appears to rise in full stature, proportion, and agility.—*Rae Wilson's Travels.*

An edict was passed in Germany, in the time of Joseph II., prohibiting females from the use of stays, as injurious to their constitutions, which is conceived in most anxious and curious terms.

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### DEDICATION TO GOD.

Every true believer in Christ cheerfully yields himself unto God, as Christ's purchased possession, to be henceforth employed by God in holy services for his own glory. The scripture often declares this. "Ye are not your own; for ye are bought with a price: therefore glorify God in your body, and in your spirit, which are God's." "Whose I am, and whom I serve." "I beseech you, therefore, brethren, by the mercies of God, that ye present your bodies a living sacrifice, holy, acceptable unto God, which is your reasonable service." "Ye are Christ's." "Yield yourselves unto God."

And this surrender of ourselves to God is our bounden duty. If by serving sin, vanity, and the world, we had incurred great guilt, and were in imminent danger of eternal death; and if Christ voluntarily delivered us, at the expense of his own sacred blood: if the Father has manifested such wondrous love toward us miserable sinners; if the Holy Spirit has deigned to enter our hearts and apply this great grace; then, the least return we can make is to give ourselves up to Christ, and cheerfully to say, Here I am! Behold, Lord, the soul which thou claimest for thyself. It is indeed utterly unworthy of thy acceptance; in itself it is full of guilt, misery, and pollution. But thou who didst die for sinners, hast called, and I have come to thee to be justified through thy merits, and now to give myself to thee. Lord, I am thine, for thou art mine. Fit and prepare my soul for thy service: make me all thou wouldst have me to be; use me in what way thou wilt: command me to what services thou pleasest: do with me, that is, with thy own, whatever seemeth thee good!

And this our duty is also our privilege. For, if we give not ourselves thus to God, we still serve sin, Satan, and the world; we are still in bondage through fear of death; we are employed in vile work, and occupied with mean pursuits. Hence it is a privilege to come out from the world, and to taste the liberty wherewith the Son of God emancipates the soul. It is a joy for the heart, after being so long enthralled, to find its proper Master, "whose service is perfect freedom." It is an honour, which humbles while it exalts, to be allowed to serve the glorious and ever-blessed God. That he will deign to employ such weak and worthless instruments; that he, who could do so well without us, will give us work to do for him; and that he makes us, who were once so ill-disposed for serving him, now quite glad to obey his will: —this is a privilege indeed! For his commandments, brethren, are not grievous when we love God. Christ's yoke is easy, for it is lined with his own love. "Blessed are they that keep his testimonies, and that seek him with the whole heart."—*Hambleton.*

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### THE CROSS AT THE CONVENT OF SANTA CRUZ,

#### NEAR THE CITY OF TEPIC, IN MEXICO."

It is related that a certain arriero, or muleteer, discovered the contour of a cross upon the grassy sod. To perpetuate this resemblance, a cross of raised earth was made upon the outline, and remains to this day, within a sacred enclosure, to be the object of veneration with all good catholics. A layman of the convent stated that a French astronomer, while making some celestial observations upon the flat roof of that building, discovered, by the help of his glasses, that the site of the sacred emblem was the exact altitude for receiving the image of the cross at Jerusalem, when reflected by the crystalline mirror of the bowed welkin!!

The obligations between priests and laymen seem likely to prove reciprocal in Mexico; the priests for many ages duped nearly all the world, but now they are becoming, in their turn, the dupes of any one who may deem it his interest to practise upon their credulity.

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Covetousness.—He is too covetous, whom God cannot suffice: he hath all things who hath Him that hath all things, Rom. viii. 32.

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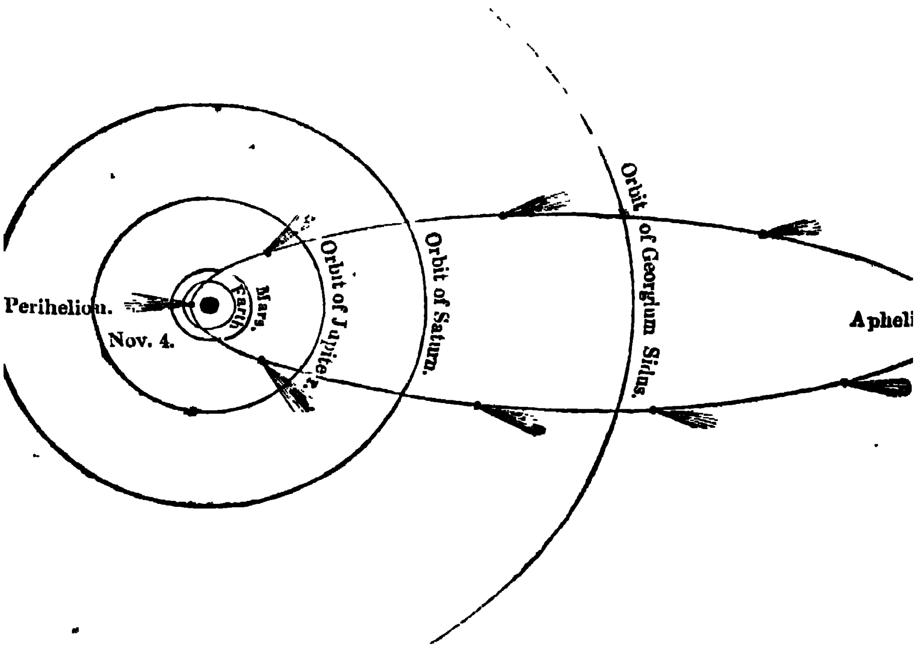
THE

# WEEKLY VISITOR.

NUMBER CXLIV.] TUESDAY, MAY 26, 1835. { PRICE ONE HALFPENNY.



## HALLEY'S COMET, AND COMETS GENERALLY.

ALTHOUGH a great number of comets have appeared at different intervals, and those which have been astronomically observed amount to several hundreds, yet very little of their real nature is known. Remarkable as this fact is, it has not arisen from an indifference on the part of mankind to turn their attention to these singular erratic objects. The extraordinary and imposing aspects, as well as the magnitude which they often assume, their rapid motions, and the unexpected manner in which they frequently burst into view, could not fail of exciting astonishment, and eliciting a desire in the breast of inquiring man to understand their nature.

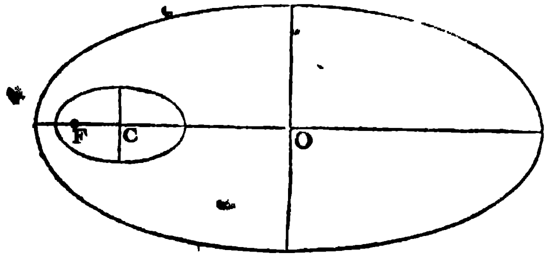
It was not till very lately that the periodic time, (or the period occupied in traversing its orbit,) of more than one comet was known, and even now three only can be numbered. To the celebrated Doctor Halley, the second astronomer royal, of whom we have given some account at p. 53 of this volume, the honour of this discovery is due. He computed the elements of the orbit of a comet which he himself had observed in the year 1682, and finding them to agree very nearly with those of the comets of 1607 and 1531, as well as that the intervals elapsed did not materially differ from each other, he considered it probable that they were but successive appearances of the same body; and upon referring to the past history of comets, he found that one had been seen similarly passing retrograde, or from east to west, (which, being contrary to the general motions of planetary bodies, or from west to east, is called retrograde,) between the earth and the sun in the summer of 1456, and also that another had been seen in 1305: this interval of 75 and double interval of 151 years, together with the retrograde motion, convinced him of their identity; and, accordingly, he ventured to predict its return again in 1758.

Upon nicer calculations, which the improved state of astronomical science afterwards afforded, its return to its perihelion was predicted by Clairaut, a French astronomer, to take place on the 15th of April, 1759, and it actually arrived at that point of its orbit on March 13, within thirty-three days of the time computed.*

Another period of its revolution is now nearly completed, and the best computations predict that it will shortly become visible in our hemisphere, and pass its perihelion on November 7th next. (See the Christian Almanack for the present year, published by the Religious Tract Society.) It appears likely, for the only time in the life of the present generation, to become an object of our astonished gaze and admiration, and to occupy a large portion of the conversation of our families and friends. We therefore consider that a few particulars of this interesting wanderer, as well as of comets generally, may at this time not be unacceptable to our readers.

We have explained at page 427 of our last volume that the orbits of the planets are ellipses or ovals with the sun, about which they revolve, situated in one of the foci which is common to all the orbits. In like manner the orbits of the comets are also ovals, but of very different dimensions; those of the former differing very little from circles, whilst those of the latter are long and flat, or what is technically termed of great eccentricity. It may not be amiss to explain the astronomical meaning of the latter term.

In the annexed diagram, we have represented two ovals of very different eccentricities. The points marked C in the one and O in the other, represent their true centres respectively, as is shown by the intersection of their longer and shorter axis; but the point marked F is the common focus of the two ovals; therefore in the lesser oval the distance F C is its eccentricity, and in the larger one F O is its eccentricity; that is, the eccentricity of an elliptical orbit of a planet or comet is the distance of the sun from its centre.



The engraving at the head of this article represents the orbit of Halley's comet, and also of some of the planets forming the solar system, drawn upon an accurate scale, by which their relative magnitudes may be seen by inspection. The sun is represented in the common focus of all the orbits; and the following table will at once show the amount of eccentricity of each, as well as the periodic times of the respective bodies traversing their trackless paths, by which it may be seen how great is the eccentricity of the orbit of Halley's comet compared with that of the planets; and as the orbits of all comets are similar, it must at once appear to our readers that when at their perihelion they are so near the sun, compared with their distance from that luminary when at their aphelion, or greatest distance, the extremes of heat and cold to which they are necessarily exposed must be such as to render the existence of either animal or vegetable life with which we are acquainted impossible.

| Orbit of | centricity. | Periodic Time. Years. | Days. |
|---|---|---|---|
| Mercury . . . . . | 0.206 . . | 0 and | 87 |
| Venus . . . . . | 0.006 . . | 0 | 224 |
| Earth . . . . . . | 0.017 . . | 1 | 0 |
| Mars . . . . . . | 0.093 . . | 1 | 321 |
| Jupiter . . . . . | 0 048 . . | 11 | 317 |
| Saturn . . . . . | 0.056 . . | 29 | 174 |
| Georgium Sidus. | 0.047 . . | 84 | 8 |
| Halley's Comet . | 17.985 . . | 76 | 0 |

One of the most remarkable circumstances connected with our knowledge of comets is, that their head or nucleus is not, as is commonly supposed, a solid body, but the whole object is a mass of highly transparent vapour; so transparent indeed, that "the stars dim twinkle through their shadowy form," those of lesser magnitude remaining distinctly visible at the time they are covered by the densest portion of a comet's substance, although the same stars would have been obliterated from our view by an ordinary fog on the surface of the earth; and since it is not doubted that comets shine, like the planets, by reflected light only, they can be regarded as no other than great masses of thin vapour, susceptible of being penetrated by the solar rays, and reflecting them alike from their interior parts, as well as from their surfaces. There are also other circumstances in their appearance which lead to the above conclusion, as to the nature of the material of which they are formed, and the following evidence is so striking, that we must not pass it over in silence. It was computed, that in 1827 a comet would pass between the earth and the sun exactly on a line connecting those two bodies, and consequently it was expected that if the comet possessed a solid nucleus, it would appear like a dark spot crossing the sun's disk, precisely in the same manner as the planets Mercury and Venus appear under like circumstances, or the moon in a solar eclipse. Unfortunately for British astronomers, the clouds prevented their seeing the sun at the computed time, but the foreign astronomers were more fortunate: both at Viviers and Marseilles, they looked diligently for it, but no trace whatever of either spot or cloud was visible, a good proof of the transparent nature of these singular appearances.

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* For an explanation of the terms "perihelion," "aphelion," &c., see *Weekly Visitor*, for 1834, p. [illegible]

When comets first make their appearance, they generally resemble a round film of vapour, with little or no pretensions to a tail, but they increase in brilliancy and the acquisition of a tail as they draw near to the sun; but it is after they have passed their perihelion, when emerging from the brilliancy of the solar light in which they have been for a short time obscured, that they assume their greatest splendour: the tail, which during the approach to the perihelion had followed the comet, now precedes it, generally with a small degree of curvature, probably arising from the resistance of the ether (an extremely thin vapour) which is supposed to pervade all space. The tails are of enormous lengths; the comet of 1811 had a tail no less than thirty-four millions of leagues in length: the comet of 1744 had its tail divided into six different branches, separated by dark intervals, each of them about four degrees broad, and forty long. Many have no tails at all, as for example Encke's and Biela's comets; but these are small and insignificant objects compared with those we have been speaking of; the chief thing that causes them to be more particularly noticed is the circumstance, that they are the only two besides Halley's comet, that are known to belong to the solar system, and whose periodic times have been determined.

In general the light of comets is dull; that of 1811 was only equal to the tenth part of the light of the full moon, but instances are on record of their having been seen in full daylight. Of the actual number of comets little is known: it has been computed by the theory of probabilities, that there may be upwards of eleven millions that come within the known extent of the solar system. But M. Arago, upon a different computation, considers that the number may be about seven millions.

S—s.

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### EXECUTION AT GOTTENBURG.

Flagrant crimes rarely occur in Sweden, and an execution had not occurred for twenty-four years previous to my visit. An affair, however, attended with marked atrocity, had taken place a few days previous to my arrival. A Danish vessel was boarded and plundered by some ruffians who had been long notorious for bad conduct. They also murdered two men and a boy, who formed the crew. On the crime being discovered, the whole country turned out to hunt them from their lurking place. They were apprehended and brought to trial. And here, it may be observed, it is laid down as a fundamental principle in the criminal code, that in cases of murder, no proof of a circumstantial nature is admitted as sufficient for inflicting capital punishment; of course, hearsay must be of less authority. This can only proceed on two grounds; namely, the full confession of the criminal, or on positive evidence of the crime being actually seen as committed. Should this not happen, he is confined to jail, where it often occurs that the horro of a guilty conscience, prompts him to confess his crime, and thus satisfy the ends of justice. The ring-leader here first admitted the full extent of his guilt, and showed the greatest marks of contrition. He was permitted to address the people on Sunday, from the window of his prison, in a kind of sermon, which, it is said, was delivered with great sincerity and devotion. At the distance of three months, the others confessed, and were all led out for execution. The mode of punishment was as follows: their right hands were first cut off, and immediately after, their heads; when their bodies, with the clothes, were stretched horizontally on the top of three different wheels, attached each to the top of a pole about twelve feet high. The heads were nailed on separate poles, of a similar height. This execution took place two English miles to the south of Gottenburg, at the side of the road, and the mangled remains are thus exhibited *in terrorem*, till they drop, from the effects of the elements!

These miserable men sacrificed their lives for the commission of an act of piracy and murder, which, as it never occurred in the memory of the oldest inhabitant, had naturally excited universal horror and indignation in the minds of the Swedes.—*Rae Wilson's Travels.*

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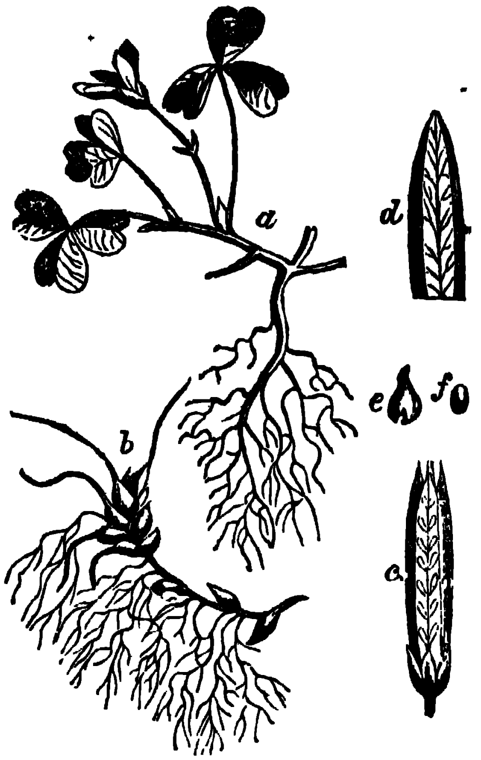
## BOTANY.—No. VI.

### OXALIDEÆ.



If the title given to this assemblage of plants seem hard, that hardness is compensated by the facility with which the wood-sorrel, the pattern and representative of all the rest, is found and distinguished. In every plantation, wood, or shrubbery, this pretty little weed may be found. If any person to whom it is a stranger should take a walk into a wood, especially where the stumps of trees are ready to afford a hiding place, he will soon find a pale green leaf, like the trefoil or shamrock, with an agreeable acid taste. These marks will denote the wood-sorrel with no less certainty than the most laboured descriptions. Older naturalists of this country, who sometimes wrote in latin, called the wood-sorrel *trifolium acetosum*, or sour trefoil, a name though somewhat old-fashioned, extremely apt and impressive.

It is easy to guess, without the help of a dictionary of etymologies, that sorrel comes from *sour*, a term more familiarly applied to a species of dock, well known for its acid properties. The terms wood-sorrel point out the nature and situation of the plant, and are of themselves its best description. We have heard some people say, when advised to take exercise for the preservation or improvement of their health, that they do not relish a walk because they have no object. Surely if we stray into a wood, and mark with what care the Almighty provides for the defence and welfare of a little plant, that seems to flourish when all its neighbours have long since been stripped of their leafy honours, he cannot be said to walk without an object. While nearly all vegetable nature sleeps to recruit her strength, as if in unmarked preparation for the beautiful displays of the ensuing spring, a few herbs are still fresh and thriving, as if to teach desponding man, that the Divine goodness even in the wintry season of adversity does not sleep, but ever scatters here and there some patches of pleasant green, as pledges of returning spring.

The plants of this order have ten stamens, with awl-shaped filaments. These filaments, if examined with a little attention, will be found to be connected together at their base. A flower of the wood-sorrel will serve for examination, and may be found so early as April. In our engraving the germen, or unripe seed-vessel *c*, resembles a five-cornered pillar or pyramid. If we inspect the sides of this seed-vessel, they seem to be each one composed of a single leaf, as represented in *d*, which has its edges folded together and fastened by mutual adhesion. In the plants of this order we have a variety of fives. For we have five divisions in the calyx, five petals, twice five stamens, five cells in the germen or fruit, and five styles. Pythagoras was accustomed to ascribe extraordinary properties to certain numbers. Now it appears that the philosopher was a very close observer of nature, from whence he fetched the knowledge of these apparently mystical properties. The pentad, or number five, was called the number of the world, inasmuch as there are five zones in the great world, and five senses in the little world, or microcosm of a man. We see by this example, which is only one among many, that the number five is of no less account among botanists, than it was among the followers of Pythagoras. We might call the practice of tracing the predominance of certain numbers, the arithmetic of botany. The seeds *f*, in each cell of the capsule, are few in number, and are attached to the inner angle of the cell, or at the seam of our imaginary leaf. When young, they are enclosed within a fleshy coat, called an *arillus*, *e*, which, opening at a chink, and contracting through the influence of heat, jerks the seed to a considerable distance. The contraction of this lodgment has a tendency to squeeze out the seed, but this tendency is checked by the edges of the orifice, which is a little too small to let it pass freely, till a slight shake affects it, when the hinderance is suddenly overcome, and the confined seed expelled with force, that it may sow itself at a convenient interval from the parent herb. With what apparent ease doth Divine wisdom bring about its ends! The mode in which a grain of wheat, or a pea, is urged to a distance, by pressing it between the thumb and finger, is not more simple than the process here described. A little shrub growing upon the pines or firs of California, fires a volley of seeds in the face of the collector, by a similar contrivance, only, instead of the arillus or peculiar coat, it has a berry. When in that country, the writer took some pains to ascertain the nature of the mechanism by which it was effected, and intends giving a more particular account of it when he treats of the missleto and its related plants.

### EXAMPLES.

*Oxalis.*—Calyx five divisions, either free or united at the base, as in the English species. Petals five, either free or slightly united at their base or claw. Stamens ten, filaments united a short distance from the base, under which condition, they are said to be monadelphous, or forming one brotherhood.

*Oxalis Corniculata*, yellow flowered wood-sorrel, *a*. Berkenhout has the credit of having first introduced this plant to the notice of botanists, to whom it had been communicated by Mr. Turner, who found it near Exeter. It has since been gathered near Cuckfield, in Sussex, and in Scotland, near Stirling, by Dr. Buchanan. Root fibrous. Stems small, spreading widely on the ground, and often taking root; round, reddish coloured, and downy. Leaves alternate, often nearly opposite, divided into three leaflets, which are commonly heart-shaped, and downy. Flower-stalks axillary, or proceeding from the bosom of the leaves; erect, bearing an umbel of a few declining flowers with a pair of small leaves, which fill the office of an involucre. In the figure *a*, there is only one flower-stalk or peduncle represented above the involucre, which is sometimes the case. Flowers small and yellow. Fruit large and pyramidal. Stamens united at the base. This plant, though rare in this country, is found scattered over various quarters of the world; in the islands of Teneriffe, Isle of France, Japan, Caribbees, Mexico, &c.

*Oxalis Acetosella*, wood-sorrel.—This plant grows very commonly in all our woods and thickets. The leaves may be found, in winter, sheltered beneath the protection of stumps and withered leaves; the flowers appear betimes in the spring, and late in summer; the capsules are found darting forth their little shining seeds on the slightest touch, by means of the *arillus*, or little elastic case before described. It is customary to speak of this plant as having no stem, which, in our judgment, is not correct, for the little red leafy string, *b*, now lying before us, is evidently a stem, though of a very humble description. The essential characteristic of a stem is the presence of leaves or leaf-buds, by which it is formed; as in fact all stems are merely the collective depositories of the vessels sent down to the root by the leaves. In the wood-sorrel we find the base of the leaf enlarged, and emitting from its bosom another leaf-bud, which, after proceeding a short distance, expands into a leaf, in form and nature like its parent. These leaves break off a little above their base, and leave behind them a small scale to attest their former presence, as represented in the engraving just referred to. To adopt the common phraseology, and say that the root is scaly, is to convey no information that is certain and definite, for the question arises, What are these scales? to which the right answer is, The remnants of fallen leaves. The resemblance of this plant to trefoil, whence it was called by old botanists, *trifolium acetosum*, and the acidity of its leaves will easily distinguish it from all others.

### SUNSHINE.

WHEN I look at the sun, and call to mind that it is a million of times the size of the earth, and ninety-five millions of miles from us, it so oppresses my brain with thoughts of infinity, that I am glad to turn off to something a little better suited to my weak understanding. It is no use grappling with conceptions beyond our power. My head can no more bear to reflect on the magnitude of the sun than mine eye can endure to gaze upon its brightest noon-day beams.

I would willingly keep within compass, and say in reference to God's creation, as I would ever wish to say in regard to the hidden things of the Almighty, "Lord, my heart is not haughty, nor mine eyes lofty: neither do I exercise myself in great matters, or in things too high for me."

But I was about to speak of sunshine. Oh how gloriously it arrays the heavens and the earth with brightness! The scenes are very beautiful that present themselves to the eye in spring, when the trees put forth their green leaves, and the birds warble the joy that they do not know how to keep to themselves. And not less so in summer, when the blossoms and flowers abound, and the woods are fully clothed. What can be more attractive than autumn, with its fruit and corn, and its trees with coloured leaves! And who is there that will deny that the bare branches of winter's oaks, and elms, and thorn bushes, when sprinkled with snow, or sparkling with hoar frost, are not lovely to look upon? and yet to each and to all of these what a wondrous additional beauty does sunshine give!

Look at sunshine on the snowy cloud; the clear blue sky, the green meadow spotted with crocuses, the hay-field when the country people are at work there; the waving corn, while the reapers cut it and bind it into sheaves; the broad-breasted mountain, or the sharp-pointed crag. Or, look at it when glittering on the murmuring brook, the weather-cock of the village church, or the window panes of a cottage. Oh it is a glorious thing! but this is only the sunshine of the eye. The sun must be visible, or we cannot enjoy it.

There is another sunshine, and I hope that you are no stranger to it. It is not confined to times and seasons, to the clearness of the atmosphere, and the state of the weather. *It is not seen, but felt.* It is known by all who humbly, and honestly, and diligently discharge their daily duties; by those who forgive their enemies; deal their bread to the hungry; bring the poor, that are cast out, to their houses; and clothe the naked. It is felt by the mother as she presses her smiling babe to her bosom, and commends it to God; by the father, when his children grow up in virtue, and remember their Creator in the days of their youth; and by the sunday-school teacher, when he sees the scholars improve that are committed to his charge. He who visits the fatherless and the widow in their affliction is sure to know it, and individuals and families feel it when they dwell in unity and affection. This is the sunshine of the heart, and they who delight to do good to others, who act justly, kindly, charitably, generously, nobly, will be sure to find its influence in their bosoms. You cannot take away trouble, nor give happiness to another, without feeling this sunshine.

But there is yet another kind of sunshine, which is not dependent on the beams of the created sun, nor on the kindly affections of the human heart. A sunshine that comes direct from One far more glorious than the sun in his noon-day brightness. It is known when it pleases God to lift up the light of his countenance upon us. At times we feel it when reading the book of truth; the words come home to us, we see that the Lord is gracious, our souls magnify, and our spirits rejoice in God our Saviour. We feel it too in the hour of prayer and praise, when our heavenly Father is pleased to bear witness with our spirit, that our petition is heard, and our sacrifice of praise accepted. We know its influence when the messenger of grace to guilty men proclaims from the pulpit the glad tidings of salvation. We acknowledge its power when christian men, in christian institutions, make plain to us the goodness of the Lord in the conversion of the heathen world. This is the sunshine of the soul. It is felt by the penitent when a sense of forgiveness melts his heart, and sets his tongue at liberty; by the missionary, when he hears the idolater offer up his praise to the Saviour of sinners; and by the aged servant of God, when, ripe for the harvest of eternal glory, he breathes forth his spirit in the words, "Now, Lord, lettest thou thy servant depart in peace, for mine eyes have seen thy salvation."

The sunshine of the eye you have seen, the sunshine of the heart you have doubtless felt; but if you are yet a stranger to the sunshine of the soul, seek it with all diligence. The eye will become dim, the kindliest, the warmest affections of the heart will subside, their brightest sunshine will be overshadowed; but the sunshine of an immortal soul, a glorified spirit, will be eternal, according to the promise: "The sun shall be no more thy light by day; neither for brightness shall the moon give light unto thee: but the Lord shall be unto thee an everlasting light, and thy God thy glory."

### RELIANCE ON CHRIST.

Might I be permitted to advert to my own experience, I should say, that I have found nothing so salutary as to turn the mind immediately to the Saviour. "Whosoever calleth upon the name of the Lord, shall be saved." To pray immediately to Christ, to cast ourselves incessantly upon His power and grace as revealed in the gospel, appears to be the best antidote to every despondency. I have no doubt that we are much wanting to ourselves in not having more direct dealings with the Saviour, or not addressing him now in the same spirit in which he was applied to for the relief of bodily diseases. He is exalted at the right hand of God, for the purpose of dispensing pardon, peace, and eternal life, to all that humbly seek his aid; and, wonderful condescension! he has declared, "he will in no wise cast out whosoever cometh unto him."—*Robert Hall.*

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### THE STORY OF GUADALOUPE, OR THE VIRGIN MARY, BY THAT NAME.

The following legend is firmly believed by many in Mexico, where the people have been kept in papal darkness.

As a peasant, called Juan Jiego, was travelling near Mexico, he was met by the Virgin, who bade him go to the bishop of that city, and signify to him her wish that a church should be dedicated to her upon the very spot where she stood. The prelate, however, believing the tale to be a forgery, dismissed the messenger with very little ceremony. Some time afterwards, the man chanced to be passing by the same place, when the heavenly visitant again presented herself, and asked why her wishes had not been fulfilled. The poor man excused himself by saying that his story had found no credence. Upon this she gave him a roll of cloth, telling him if the bishop should still remain incredulous, to open the folds of this testimonial. He obeyed, and, in the presence of the unbelieving priest, unrolled the cloth, which, in the season of winter, disclosed a shower of full-blown roses.

Our informant, who had seen the cloth, stated that there was nothing divine in its appearance, and that it is only worthy the ordinary skill of the meanest housewife. But though the coarse, homely, and, if we may use the term on such an occasion, the unheavenly appearance of this memorial, seemed to inform against the propagators of this idle fiction, yet the people of Mexico tell it to their children and to strangers as a piece of authentic history. We see from this example, that there is nothing, however gross it may appear to a reasonable mind, which will not meet with acceptation in a land where the Bible is seldom seen, and never read. L.

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### SPEECH OF A GRIQUA CHIEF.

*To the Editors of the Weekly Visitor.*

Gentlemen,—The inclosed extract from a newspaper published at the Cape of Good Hope, may not be unacceptable to some of the readers of your excellent little work.

The speech was made by the chief of the Griquas, (one of the Hottentot tribes,) named Waterboer, at a subscription dinner in Cape Town, to celebrate the event of the emancipation of the slaves belonging to the colony.

It may be satisfactory to add, that the first of December, 1834, the day on which liberty was proclaimed to the captive, passed without the slightest disturbance in the town or its vicinity, the only feeling expressed by the emancipated slaves, being that of thankfulness "to his majesty the king of England, and all the honoured gentlemen of the parliament," for it is in these words that they expressed themselves.

It is intended to erect, by subscription, a school room in Cape Town, to commemorate the day on which slavery became extinct in the colony of the Cape of Good Hope. L.

"On his health being proposed by the chairman,

"Waterboer rose and returned thanks for the honour done him! He spoke in the Dutch language, and we have to express our deep regret that we can present to our readers only a mere sketch of a speech, which all who understood the singularly nervous, but highly figurative style in which he always expresses his thoughts when roused or excited, as he evidently was on this occasion, agree in describing as eloquent and impressive in the highest degree.

"He began by saying, that he was unable to express the gratitude and joy he felt at the honour done to him in being invited to join such a company, on such an occasion; and the great satisfaction he experienced in his heart, at having been so providentially brought to this town at the moment when liberty was to triumph openly, and her triumph was to be openly celebrated.

"He greatly rejoiced in the new spirit which he found gradually making ground against old prejudices, and the old, selfish, and oppressive state of things; and he considered it the greatest honour of his life to be one of the present company, whom he considered as the representatives of all those in the colony, who were the friends of freedom, and of justice, and of the improvement and happiness of their fellow-men, of all classes and colours. The spirit they manifested, was a spirit which he loved; a spirit which was rapidly diffusing itself in this colony; a spirit that carried with it the germ of improvement, and happiness, wherever it obtained. Formerly, he said, in this land we were covered with darkness, involved in a dark cloud. The English came. The missionaries went forth. The cloud began to melt and dissolve. The light shone upon us. But light alone will not give life. The heat, the genial warmth of benevolence and charity, and universal love, these revive, invigorate, cheer! Knowledge with goodness, with religion, makes men to live, and opens up all our nature to view! I foresee the diffusion, said he, of this living, this life-giving spirit of the English. It is a fire that cannot be confined amid the dry materials of the field or the forest. It will spread from sea to sea. It will reach to the ends of the earth. Men say that England is far to the west. But England, I say, is also far to the east. We are in the midst of England. We are every where surrounded by her sons. May her spirit be in us. May we be worthy of her name! My mouth is too small, my tongue is too small to express what I think on this subject; to speak my gratitude! Could I but convey what I feel in my heart, I would sit down happy. They had done him, he said, and all the chiefs of the frontier, whom he was proud to represent on that occasion, the honour to make mention of their names, and to wish them prosperity. He rejoiced to inform them, that, through the liberality and just policy of the British government, he and the other frontier chiefs were about to enter into a new relationship with the colony. Mutual interests had indeed always secured mutual understanding; but now they were about to enter into an acknowledged and definite relation. And here he could not avoid making mention, and he did so with peculiar feelings of pleasure and gratitude, of the kind and fatherly manner in which he and his party had been treated since he came to Cape Town; but more especially was he grateful for the ready, and considerate, and honourable manner in which his excellency, the governor, had attended to the important objects which he had submitted to him, and had been pleased to grant all those means, and all that assistance, by which the peace and security of the frontier of this colony, and of the opposite district, would be preserved, and the welfare of his people, and of the adjacent tribes, promoted. These are new days. Great things are already effected, and the time is not far distant when the spirit and influence which have so long separated and degraded the different classes of men in this colony, and which is now struggling in vain for life, shall die, and be buried for ever! Providence has raised up men suited to the times; men, able to conduct the vast improvements now in progress; men, who, in order to save all classes of the colony, have devoted their all to the great work. May God give them success, and happiness to all!"

During this address, of which the above gives but a faint outline, Waterboer was repeatedly interrupted by bursts of hearty applause and sympathy. His action, voice, and emphasis, were so well managed, that many who but imperfectly understood his words, were able fully to enter into his feelings, and to follow the course of his mind. He has for ever vindicated the much-traduced name of Hottentot. He sat down amidst rapturous applause.

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## PUBLIC WORSHIP.

If a man is grateful to his benefactor, he will tell him so; if no acknowledgments are made, and no outward signs of gratitude manifest themselves, he will be chargeable with ingratitude. But, if expressing our gratitude and praise from time to time in words, is, by the Deity, required of us as a duty; if it is beneficial to ourselves; and if, as an example, it has good effects on our fellow-men; no argument can be necessary to prove the propriety of the practice of public worship. —*Dr. Beattie.*

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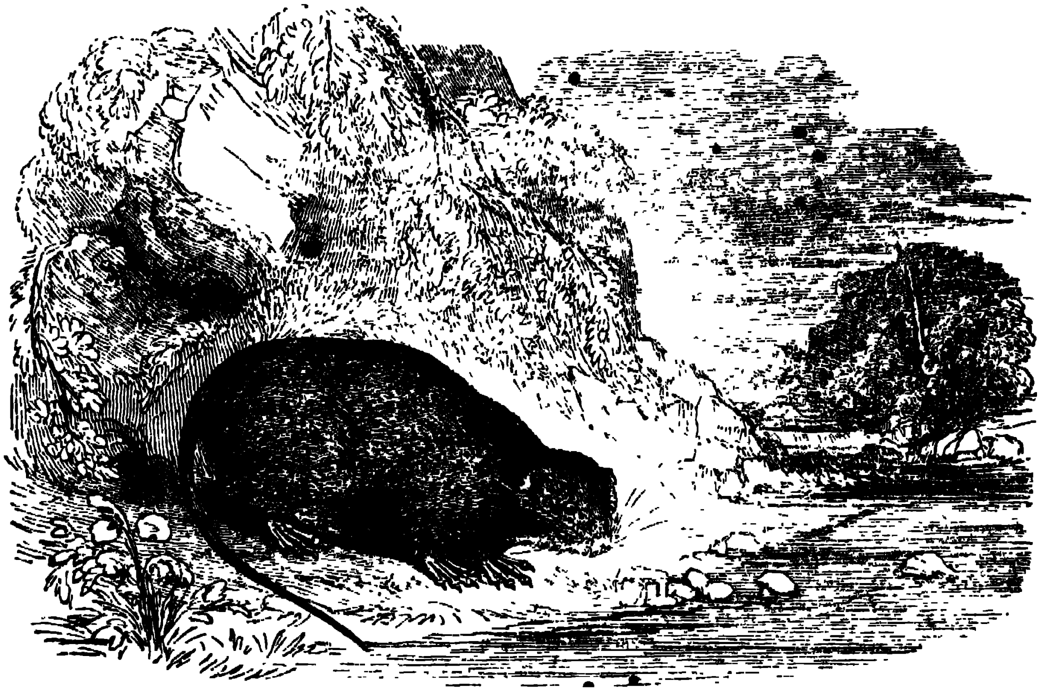

## THE WATER-RAT.

*(Arvicola amphibia.)*

Of the smaller mammalia which are abundant in our island and on the adjacent continent, few are less known, as it respects their habits and manners, than the water-rat, (*arvicola amphibia.*) Indeed, this little animal is by most regarded as a variety of that destructive pest, which abounds in barns, stables, out-houses, and which multiplies even in our towns and cities, intruding into our dwellings, and undermining the walls and floors. The common rat (*mus decamanus*) often, it is true, takes up its abode along the sides of drains, &c., near houses in the country, but it is not aquatic in its habits, at least it seldom takes voluntarily to the water. From this voracious animal the water-rat is truly distinct, it belongs even to a separate genus, (*arvicola.* Lacep.) possessing decidedly differential characters.

The water-rat is never found far from the water. It dwells in burrows made in the banks of rivers, ponds, ditches, &c. These burrows are always of a considerable extent, and have generally two or more outlets. Their entrance is usually close to the water's edge, so that, during floods, it is often below the surface; as, however, the gallery rises while it proceeds, the snug little chamber to which it leads is seldom flooded. In this asylum the female brings forth and rears her young, having previously prepared a nest of fine grass and vegetable fibres.

Nocturnal in its habits, it is only as evening closes in that the water-rat emerges from its retreat, to seek for food, and gambol on the grassy bank. Those who are accustomed "to trace the woods and lawns, and living streams, at eve," have often surprised the water-rat thus busied among the tangled herbage, or been themselves startled by the sudden plunge into the water, made by the animal scared at their approach.

In stagnant marshy water, mantled over

by a luxuriant growth of chickweed, the tracks of this animal during its nightly wanderings, when it frequently has to cross and recross the intervening stream, are plainly visible: in some places we have seen these "open-water" marks among the floating leaves of the thickly spread weed so numerous as to suggest that a general meeting had taken place the night before, in order to settle the affairs of the colony.

The food of the water-rat consists of the roots of various plants, seeds, &c., to which insects, slugs, &c.,are usually added.

Among the hybernating mammalia of the British islands, we must reckon the present animal; though the period of its repose is not very protracted; as we observe it late in autumn, and early in spring. It is, perhaps, only during the prevalence of long and hard frosts that it becomes completely torpid. The same observation, indeed, will apply to the bat, which we have observed on the wing as late in the season as October, even when the air was chilly, and which is again seen with the first breath of spring.

In size, the water-rat equals the largest of the common race; but the head is of greater magnitude, and thicker in proportion, the muzzle being obtuse. The ears are rather small, and buried in the fur. The body is stout, the toes are four before, and five behind, but unwebbed, though the animal swims and dives with great dexterity. The tail is shorter than the body, covered with hair, and somewhat compressed, as is the case in so many of the aquatic rodentia, this peculiarity of form being at its maximum of developement in the beaver. The fur is smooth, close, and glossy; its colour of a dark brown above, and of a brownish white beneath. The eyes are small and black.

M.

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## DEVOTION OF PROPERTY.

Mr. Cobb, of America, died in May 1834, in his thirty-sixth year. He resolved at the commencement of his religious life, that he would serve the Saviour with all his power, in that sphere which seemed to be particularly assigned to him. He had not an opportunity to acquire extensive learning, and he could not serve the church, to any considerable extent, by his voice or by his pen. But God endowed him with very unusual talents for business. He had great activity, acute penetration into the characters of men and into the signs of the times, rapid decision, and unconquerable perseverance. He displayed in the counting-room some of the mental qualities which made Napoleon the irresistible victor in a hundred battle fields. As a natural consequence, Mr. Cobb accumulated property with great rapidity; and if he had chosen to devote himself to the narrow work of amassing wealth, he might, perhaps, if he had lived, have become exceedingly rich. But he justly regarded his talent for business as an instrument which he ought to employ for the glory of his Saviour. He felt it to be his duty to use it in earning money for the cause of God, on precisely the same principle that it is the duty of the minister to devote his talents for preaching to the service of the Lord Jesus. He accordingly, in November, 1821, drew up and subscribed the following very remarkable document:—

"By the grace of God, I will never be worth more than 50,000 dollars.

"By the grace of God, I will give one-fourth of the net profits of my business to charitable and religious uses.

"If I am ever worth 20,000 dollars, I will give one-half of my net profits; and if I am ever worth 30,000 dollars, I will give three-fourths; and the whole, after 50,000 dollars. So help me God, or give to a more faithful steward, and set me aside. Nov. 1821. N. R. Cobb."

To this covenant he adhered with conscientious fidelity. He distributed the profits of his business with an increasing ratio, from year to year, till he reached the point which he had fixed as the limit of his property, and then he gave to the cause of God all the money which he earned. At one time, finding that his property had increased beyond 50,000 dollars, he at once devoted the surplus, 7,500 dollars, as a foundation for a professorship in the Newton Theological Institution, to which, we may add, he gave on various occasions, during his life, at least twice that sum. So scrupulous was he in his adherence to the covenant which he had made, that when peculiar circumstances required him to retain in his hands more than 50,000 dollars, he consulted judicious friends, whether he might do so consistently with the spirit of his pledge, provided that he always held the surplus as really belonging to the cause of God.

Here is the secret of that wonderful liberality which cheered so many hearts, and gave vigour to so many institutions and plans of benevolence. It sprung from steady religious principles. It was a fruit of the Holy Spirit. He always felt that God had bestowed on him a rich blessing, in enabling him thus to serve his cause. On his death-bed he said to a friend, in allusion to the resolutions quoted above. "By the grace of God—nothing else—by the grace of God, I have been enabled, under the influence of these resolutions, to give away more than 40,000 dollars. How good the Lord has been to me!"

It is added:

But Mr. Cobb did not wait till he had acquired 50,000 dollars before he began to devote his money to religious uses. It was in 1821, while he was yet young, and comparatively a poor man, recently established in business, that he resolved to give one-fourth of the net proceeds of his business to benevolent purposes. It was then uncertain what would be his success; but he felt it to be his duty to begin then, with the resolution to increase the proportion, if God should prosper him. There are many christians who think that if they could accumulate a certain sum, they would then be generous. They say that they must first make provision for themselves and their families, and then they will distribute their money liberally. Mr. Cobb did not act thus. He, from the beginning, gave a large proportion of his income, and trusted in God that whatever should be necessary for himself and his family, would be supplied.

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## A CURIOSITY.

The following description of a school clock given by the Philadelphia Intelligencer, is indeed a curiosity:—

In the Ladies' Institute of this city, conducted by the Rev. R W. Cushman, in Arch, near Seventh-street, there is a clock, which for the ingenious round of duty that it is made to perform, will compare with any curiosity of the present day. By an invention of Mr. Cushman, this clock is made to ring a bell, calling the scholars together in the morning, and when they are assembled, it presents them with the word "study," on the upper part of the dial. When the morning is half over, the bell strikes again, and the word "recess," takes the place of "study." By a vote of the scholars, it was decided that not a whisper should be made in the school hours, except during this recess. While that word presents itself, for three minutes only, the school is in a buzz; but when study returns, implicit obedience follows. Several other words are presented by the same arrangement, and the effect is admirable. Its advantages are seen in the perfect order which reigns in the institute.

## MEDICAL PROPERTIES OF OXALIDEOUS PLANTS.

Among the various reasons why we should call upon our souls to bless the Most High, the Psalmist reckons that instance of his goodness in causing the herb to grow for the service of man, Psalm civ. 14. By service, is generally implied that obedience which a vassal owes to his lord, a slave to his master. From whence we are taught to consider that there is no plant, whether it courts the solar beams in the open waste, or affects the retired shade of the valley, which does not possess some property which art or science might render subservient to the interests of man. Every advance we make in natural science seems calculated to give an additional impulse to our curiosity, to encourage our researches, and to bear out the assumption, that amidst the varied array of vegetable existences, there is not one which, while it served to whet the intellectual acumen of man, would not, under proper management, minister to his health and comfort. There is something delightful in the thought, while we steal along our hedgerows, and contemplate the various weeds which find shelter there, that all these were ordained to be our servants, and that there is not one of them which will not be ready to render us some good office, whenever we shall know how to make a right use of it. Two of the vilest weeds in scent and aspect, of all the plants that are indigenous to this country, have obtained a place in the "Materia Medica," the hemlock and the henbane. A preparation from the former, under the name of conium, comes to the aid of our little ones, when they hold conflict with the strangling paroxysms of the chincough, and that too, after medical practice has found all other reputed remedies unavailing. While the latter furnishes a tincture which is styled by practical chemists a most elegant preparation, and figures not less frequently than any other medicine in the physician's prescription.

But let us not forget the object of this paper, which is to make a few remarks upon the medical uses of the oxalideous plants and trees. We may take it for granted that none of our readers, after the perusal of this article, and that on the oxalide, will be strangers to the wood-sorrel, if leisure should allow them an opportunity of taking a turn in one of our woods or denser copses. The grateful acid taste of this little plant which old authors call lujula, would, on the first acquaintance suggest to an observant mind, that some preparation of it, exhibited with due reference to time and circumstance, might prove a useful medicine in febrile disorders. Such, indeed, it has been found, insomuch that while modern dispensatories have displaced many plants that once held a high position in general estimation, the wood-sorrel still retains its place. If the fresh leaves be put into a mortar with moist sugar, and be pounded till the mass be reduced to an even consistence, a very cooling and delightful conserve is produced, which may be used with great effect to allay the heat and thirst of feverish excitements. A very grateful drink may be readily prepared by boiling the fresh leaves in milk, which has been found to answer the purpose of allaying thirst in feverish disorders, better than the conserve just described. From this plant may be obtained that acid which is commonly known by the name of the "essential salt of lemons." On the continent this salt is prepared in the following manner: the juice of the fresh plant is allowed to subside after being slightly heated, and then clarified by the addition of water, in which a small portion of fine clay is suspended. This clarified juice is next boiled till a pellicle forms on its surface, and then put aside for a month to crystallize.

¶ A plant of this genus, *oxalis*, distinguished by its fleshy stem and leaves, is very common near Conception, in Chili, where the juicy herbage has often quenched the writer's thirst, when the gushing spring and melodious streamlet were not to be found. But we are not only indebted to this plant for timely refreshment, but also for some useful reflections upon the kind compensating arrangements of nature. For the reader should be informed that nothing, among the averages of common occurrence, could present a greater contrast than the succulent character of this plant, when compared with the dry and sun-burnt soil from which it derives its support. The question that spontaneously introduced itself, was, "From whence is this moisture obtained, for the soil seems incapable of furnishing any thing besides a barren support?" Though experiment assures us that there is a certain portion of moisture in the most arid soil, yet, rated at its utmost, it could not furnish a supply adequate to the wants of such a plant, did not assistance arrive from a different quarter. The hygrometer informs us that the atmosphere of a warm climate contains more moisture in a state of vapour, than one lying nearer to the colder regions of the polar circles. To this source it seems to be partly indebted for that material from which its grateful sap is elaborated. So that while many other plants discharge with great rapidity the steaming vapour through their expanded pores, this species of wood-sorrel is furnished with the power not only of retaining what it has gotten, but of acquiring a fresh supply through the channels of communication just mentioned, from the atmosphere that surrounds it. Nature, ever kind and watchful, we see, from this example, withdraws a benefit with one hand, to bestow it with the other. For the moisture that is exhaled by the burning sun, is lodged in the atmosphere, and in a form so auspicious, that we have often seen the most succulent plants growing in the most arid soil. So it fares with man. God often withdraws some advantage, that he may give us its equivalent in a shape better suited to our wants and capacities. When we apply the term nature to that beautiful system of secondary causes, which are in unceasing operation before us, we do it in compliance with the customary phraseology, but desire never to do it without feelings of humble reverence for the great Cause of all causes, by whose all-powerful word all the creation was at first formed, and is still governed.

The line which separates between the medicinal and the nutritious properties of plants, is often so fine and evanescent, that we hardly know where to fix it. Hence, we shall be forgiven, if, on these occasions, we sometimes mention qualities that do not enter into any healing process. A species of oxalis sometimes cultivated in the gardens of the curious, has a root which yields tubers like those of the potato. These tubers, when dressed, are of a delicate whiteness, and possess a bland and excellent savour. The stems of the same plant may be employed in the same way as those of the rhubarb. At one of the periodical levees, of a celebrated botanist, some fanciful kinds of pastry composed of these stems, were set before the company; but as the writer's engagements called him away, before this botanical repast was served up, he cannot give his personal testimony to the excellence of their flavour.

To this order or family of plants, belongs the *Arallan*, a shrub found by the writer of this, in the romantic village of Jalisco, about sixty miles from San Blas, in Mexico. In aspect it resembles our common whitethorn. The flowers and the leaves, as happens in our elm and ash, appear at different seasons. These flowers present themselves in little clusters, and contain within their neatly finished corolla, ten stamens, which are, alternately, one longer and one shorter. The number ten, in addition to the circumstance of their alternating length, forms, as we have hinted in our paper, No. 6, one of the leading characteristics of the oxalideous family. It was the practice of the writer and his companions, when employed by government on a scientific expedition, to ask all the residents we met near any spot which had afforded some curious plant, the history of its uses and properties. In conformity with this custom, we questioned the Alcaide of Jalisco about the qualities of the arallan, who, in the presence of many by-standers, assured us that the fruit was an excellent stomachic. This fruit, with which we subsequently became acquainted, is about the size of a Siberian crab, and, when ripe, of a yellowish green colour. It possesses a pleasant acid taste, with a peculiar aromatic flavour. In this aromatic flavour, the stomachic powers seem to reside; and from experiments tried upon ourselves, we can add our individual voucher in testimony to its good effects. It is remarkable, that while acid fruits are apt to disagree with the stomachs of sedentary persons, the arallan may be eaten to excess without producing any untoward consequence, save the necessary feeling of repletion, which we experience when a long fast has been followed by a hearty meal. The arallan appears to be a new species of the *Averrhoa*, hitherto unknown to European botanists. Of this genus two species have been long known as natives of India and Cochin China. These are the averrhoa bilimbi, and the averrhoa carambola. The averrhoa bilimbi rises to the height of about eight feet, with a few reclining branches; the leaves are winged, with about ten pairs of leaflets. The clusters of purple flowers adhere closely to the trunk of the tree. These clusters are succeeded by five-cornered, oblong apples, about the size of one's finger. The averrhoa carambola which we saw growing in China, is a middling-sized tree, with a spreading tuft of branches at the top. The leaves are winged with about four pairs of leaflets. The flowers are variegated, with purple and white, and are borne in clusters. The apple is about the size of a hen's egg, with a yellow rind. The fruit of both these trees is replete with a pleasing acid juice, and, when eaten with proper reference to time and quantity, allays those fervours which heat and labour excite, and which are, in torrid climes, the frequent forerunners of more serious disorders. The sensible characteristic of the oxalideous family is the presence of oxalic acid, and it is interesting to observe, that when we cannot find it in the stem, we may expect to meet with it in the fruit. L.

## THE UNWELCOME PASSENGER.

Some years ago, in travelling one evening towards London, I happened to be the only passenger inside the mail. There are seasons when we would not willingly travel without company, but, being at the time in a reflective mood, I hoped that no one would disturb me. For some miles I had my wish, but suddenly the mail stopped near the gate of a farm-house, and a man of an unusual size soon clambered up the steps into the coach. From the glance I had of him, assisted by the bright lamp on that side the mail-coach, I concluded, at once, that he was some honest farmer, who would talk of nothing the whole of the way but turnips, clover-seed, barley, pigs, sheep, and cattle.

To defend myself as well as I could from so unwelcome a trespass on my reflections, I affected to be sleepy, and leaned back quite in the corner of the mail; but my fellow-traveller was not to be so easily defrauded of a friendly chat, and began at once, just as I had anticipated, to speak of the effect of the late rain on the turnips.

To all he said, I replied yes, or no, as the case required, and hoped that he would soon relapse into silence, but in this I was quite mistaken. Finding it impossible to evade his conversation, I tried to submit with a good grace, and endure patiently what I could not avoid. But here it will be well honestly to confess that I thought very little of the farmer, and plumed myself highly on my superior knowledge. In short, I felt, in talking to my companion, like a man who confers a favour by his condescension. Such is the weakness, the folly, the pride, and the vanity of the human heart!

After speaking of the produce of the ground, of cattle, and of the high prices of some things, and the low prices of others, my companion ran into other topics, and so completely astonished me by the extent of his practical information, that I began to wonder wherever and however he had contrived to pick up so much knowledge.

He spoke of the value of human labour as compared to machinery, of the population and resources of the country, of its mines, its manufactures, and its commerce, of the poor laws, of capital, and of the influence of paper money. In short, he got so far beyond me, that I felt like a schoolboy in the presence of his master. Yes, the very man whom I had estimated so low as to think myself greatly his superior, was as a giant, and I as a dwarf.

On inquiring, I ascertained that he was a man largely interested in mines, that the workmen employed by him amounted to several thousands, that the advantage of his practical knowledge was sought by his Majesty's ministers, and that at the time when he travelled with me, he was on his way with calculations of an important nature to the first lord of the treasury, the prime minister of England.

I felt little in my own eyes. O it does us good, when puffed up with an undue notion of our own importance, to meet with a reprimand like this. It was a rap on the knuckles that I shall not soon forget, nor do I think that from that time to this I have ever undervalued a man on account of his appearance. What my companion thought of me I cannot tell, but I know well what I thought of myself. It was altogether a humiliating affair, and taught me to prize more highly than I did before, the injunction of holy writ, "Be not wise in your own conceit." L.

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## MUSIC.

The Cretans commanded that the sons of freemen should learn their laws with some kind of melody, in order that their souls might be won by music, and they might receive the laws into their memories with greater ease. Another end contemplated by the legislators was, that if they did any of those things which were prohibited by law, they might not found their plea upon ignorance. They ordained, in the second place, that the children should be taught those hymns which set forth the praises of the gods; and in the third place, that they should also commit to memory the elogies or laudatory songs which rehearsed the virtues of good men. The scope and drift of laws are to make us render to every man his own, as Cicero teaches us in his book, "De Legibus." By learning the laws, therefore, the Cretan youth were enabled to understand what they owed to others, which corresponds to our duty towards our neighbour, as taught in holy scripture. The hymns dedicated to the gods recited their wonderful achievements, particularly in showing kindness to man. The example of these idolaters give us a hint to teach our little ones to chant the marvellous acts of Jehovah, and the tender mercy of our gracious Redeemer; while the acts of his holy apostles should be inscribed upon the memories of all christian children, that they may learn betimes to imitate their zeal and patience.

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## DEATH BEDS.

### A CONTRAST.

Mirabeau, like all the leading names of France for the last century, was an infidel; it was the melancholy fashion of the time, and considered essential to the reputation of all who pretended to philosophy. There was but little in the religion of the land to rebuke the evil spirit; and its name was Legion. His last effort, when his speech failed him, was to write on his tablets, "Death is but a sleep," and to request "some opium to extinguish his life and his pains together."

Still, even in this fatal insensibility to all that constitutes the true greatness of the dying mind, and to those illustrious hopes and feelings which, to the christian, throw their light across the grave, the sinking man of genius showed some of that brilliant buoyancy which had once given him such distinction among his countrymen. "Take away," said he, "from my sight all those funeral-looking things: why should man be surrounded by the grave before his time? Give me flowers—let me have essences—arrange my dress—let me have music, and close my eyes in harmony."

But this passed away with the return of pain, and he once more asked eagerly for opium to end his struggle. The physician to quiet his mind, gave him some water i a cup, telling him it was opium; he swallowed it, dropped back upon his pillow, and was dead."

* * * * *

"My letter was interrupted," writes the Rev. R. Watson, "by being called to visit an old follower of Jesus Christ: I have been much profited by the interview. I have not been to instruct, but to be instructed. One of his expressions was, 'Days, weeks, and months have rolled round during my affliction, and I have scarcely known the night from the day, nor the day from the night, so rapidly and joyfully have the hours escaped me; I have felt nothing but joy and love; not for a moment have I been impatient or weary, or wished it otherwise with me, so marvellously has God wrought in me. This is the hand of God. This never grew in nature's soil.'"

May I die the death of the righteous, and may my latter end be like his!

## ON THE MISSIONARY INSTITUTIONS IN SOUTH AFRICA.

[From W. H. B. Webster's interesting Narrative of a Voyage to the Southern Atlantic Ocean, in his Majesty's sloop *Chanticleer*, during the years 1828, 1829, 1830.]

The sons of Africa are regarded by some as the descendants of Ham, whose progeny were to be in perpetual bondage, and the "servant of servants," to the end of time. This really seems to have some analogy with the prophecy respecting the jewish nation, and presents a remarkable fulfilment of what is foretold in holy writ. Turning from the natural to the moral consideration of man, we must regard the hottentots as affiliated brethren, to whom we are bound in christian duties. And here it is with satisfaction that I record my admiration of the labours of the missionaries, men who, in a truly evangelical spirit, brave all kinds of perils and hardships, and even death itself, not through a prospect of temporal gain or glory, but through a desire to ameliorate the condition, and save the souls of barbarous and suffering nations. The dauntless enterprises, the fearful perigrinations of many of these virtuous men, if properly appreciated, would be found to vie in romantic daring with the heroic achievements of chivalry, excited by a motive of a firmer and far more exalted nature.

By the exertions of the despised missionaries, new fields of discovery have been opened to the philosopher. They have penetrated into regions which other travellers never reached, and have explored parts before unknown. They have presented man under circumstances the most peculiar and interesting in which he can be contemplated; they have added new facts to his natural history, and new features to his physical character; they have added fresh languages to the list of those already known; they have opened new places of refuge for our fleets, and new channels for our commerce; and they have multiplied the friends of their country.

Apart from christianity, the labours of these men must be interesting to the philosopher, the politician, and the philologist; and to hold such men up to scorn is no less a violation of good taste than of proper feeling and principle. Through them the kraal of the hottentot has been supplanted by the well built village; and the missionaries at Theophilis (an inland establishment) have instructed the natives in the christian faith, and have pretty well succeeded in making a useful class of labourers and citizens. They have collected the dispersed wanderers, have procured land for them, and have taught them to cultivate it. Surely there is a conquest over the human mind that conciliates all it subdues, and improves all that it conciliates.

A French ship was wrecked while we were at the Cape, on the coast of Caffraria. Five only of her crew reached the shore, and they were moreover plundered and ill-treated by the savages; in fact, they were made slaves. A missionary in the interior hearing of the event, hastened immediately to their succour; he succeeded in liberating them from the natives, and took them under his protection; he gave them every assistance in his power, and passed them across the desert, from one missionary-house to another, in safety, till at length they reached Cape Town. And this was a journey of a thousand miles across a barren, desert country, in the midst of rude and lawless tribes; but these tribes paid more respect to the voice of the missionary, than they probably would to the sword. Here was a triumph.

To succour the distressed, to relieve the afflicted, and to turn the unruly wills and affections of sinful men, to "the wisdom of the just," is the missionary's grateful task. Their houses in this colony are as beacons in the desert, and watch-towers for the shipwrecked mariner, the asylums of the distressed, and the abodes of peace. These holy men are the first to extend, and the last to withdraw the boon of charity and the right-hand of fellowship.

## EARLY RISING—EARLY REST.

The studious are noted for their disregard of "the regular hours of rest." The solemn stillness of night inviting to those pursuits which require a fixed attention, and a connected series of thought and reasoning, leads them first into the habit; which is subsequently strengthened by the circumstance of intense application of the mind uninterrupted by sufficient and appropriate exercise, producing a state of nervous irritability inimical to sleep. Hence the student fears to leave his midnight lamp for a couch, which he can only occupy in a state of restlessness. Let him, however, relinquish his nocturnal studies, and seek, during the natural period, that repose which his mind and body alike demand—appropriating "the hours of early morn" to study, and the residue of the forenoon to exercise, and we are well persuaded, that while his progress in the pursuit of knowledge would be in no degree retarded, he will be the gainer, not merely in the enjoyment of more perfect health, but in the increased clearness and vigour of the intellectual faculties.

It has been very correctly remarked, that the atmosphere of the night is always more vitiated, and consequently less fit for respiration, than that of the day; and as we respire a greater portion of air when awake than in a sleeping state, it follows that from these, independent of other causes, the system is more liable to injury in the former than in the latter state.

Early rising is equally important to the health of the system as early rest. On no account should any one permit himself again to slumber, after the moment of his first awaking in the morning, whether this happen at the early dawn or before the sun has risen; even though from accident or unavoidable causes he may not have enjoyed his six or eight hours of repose. It is much better to make up the deficiency, if necessary, at some other time, than to attempt taking another nap. Whoever shall accustom himself thus to rise, will enjoy more undisturbed sleep during the night, and awake far more refreshed, than those who indolently slumber all the morning. *

Even this second nap is, however, by no means so injurious to health as the practice of continuing in bed of a morning, long after waking; nothing tends, especially in children, and young persons generally, more effectually to unbrace the solids, exhaust the spirits, and thus to undermine the vigour, activity, and health of the system.—*Journal of Health.*

## INDUSTRY.

It has been customary, from time immemorial, to regard the bee and the ant as the emblems of industry and foresight. The repugnance which mankind generally feel to spiders, on account of their venomous character, has been the reason, perhaps, why many of their peculiarities are seldom referred to except in books that professedly treat on Natural History. Yet we know not where a fitter emblem of resource and perseverance can be found. If the web is broken by design or accident, the spider instantly sets about repairing the damage; and when put into the box of an entomologist, or insect-hunter, instead of bemoaning her condition, she presently begins to intersect her dark dwelling with sundry threads, to be in readiness when they are wanted. The individual who is without real knowledge or practical skill, may resemble the spider in the unattractive part of her history, but can neither befriend himself nor others, when the means which others have acquired are wasted, or Providence has cast him where wealth and birth can no longer assist him. "Lay up for a rainy day, not money, but knowledge, for that will help thee when money cannot." What mean and wretched expedients do many invent to kill time, as if there were nothing good or manly in the pursuits of learning, religion, or charity. L.

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Weather.—The term weather, which now denotes the state of the atmosphere, seems at first to have had the same meaning as the word air. For the Teutonic Wetter, whence weather, is more applicable to a thing, than a state or condition of things. The air which surrounds the earth, was called the Wetter, because it was the medium of wet or moisture, just as it is called the atmosphere, because it contains the vapoury exhalations from the earth, and is the fountain of rain and dew, as well as of mists and fogs.

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## LOVE AND FAITH

Love attempts much for God, looking to the command; and Faith expects much from God, looking to the promise.

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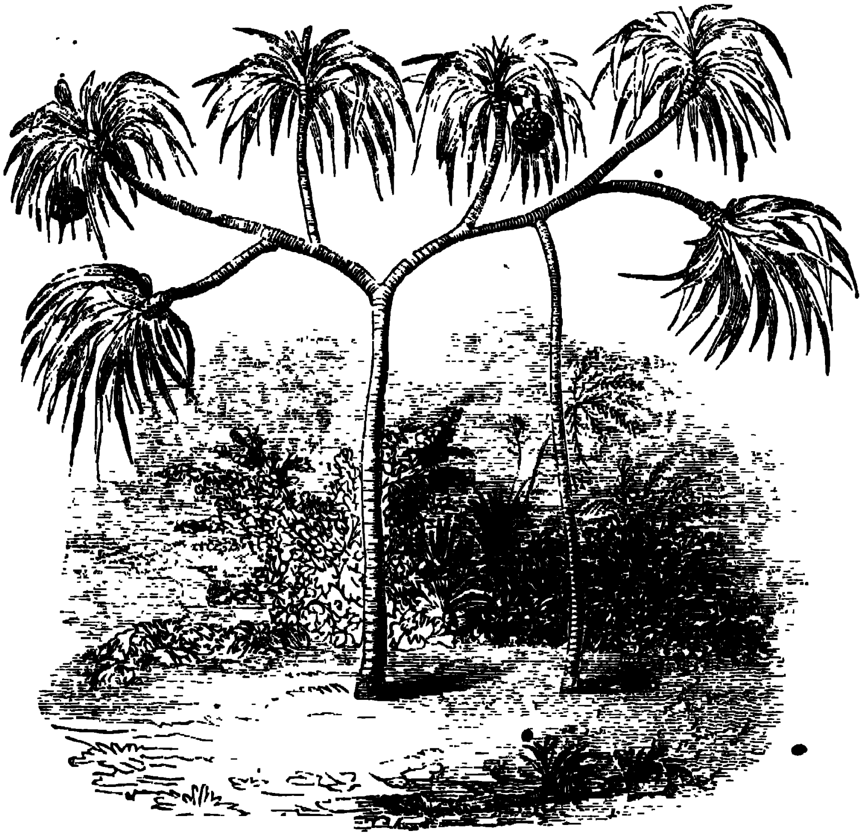
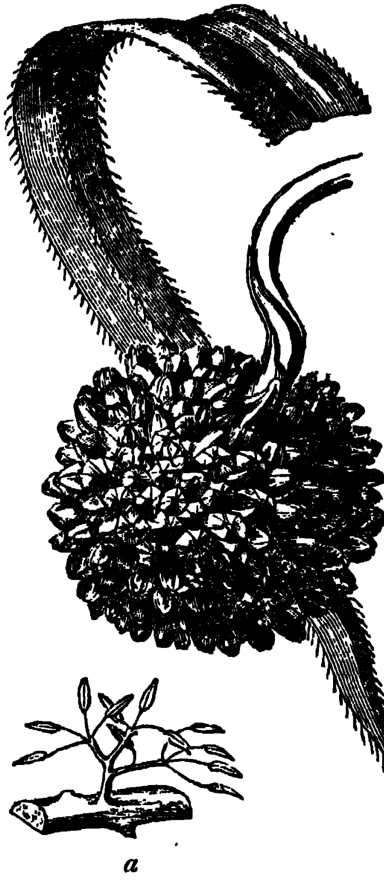


PANDANUS ODORATISSIMUS—SWEET-SCENTED SCREW PALM.

THIS singular tree, of which we have given a sketch from memory, is very abundant on all the coral islands, or that uneven line of dangerous reefs, which stretch, with here and there a cluster, between the latitudes 15° and 25° in the South Pacific Ocean.

The pandanus resembles the palms, in having the stem terminated by a tuft of long narrow leaves. These leaves in shape resemble a blade of grass, or the foliage of the pine-apple, but measure between three and four feet in length, and have their edges defended by sharp, crooked prickles. The stem is a continuation of scars, which are occasioned by the falling off of the outer or lower leaves of the tuft as new ones rise from the centre to supply their places. In this manner every leaf, in its turn, bequeathes the base on which it rested to the tree that bore it; and thus every falling leaf lengthens the woody and bare part of the branch. It is apparent to the eye here, that a tree is an accumulation of those several deposits which each successive leaf has furnished. In trees, such as the oak, ash, &c., each leaf, as it expands, sends down to the root vessels along the bark, to provide for its wants; in the pandanus each leaf does, in like manner, detach vessels in quest of nutriment, but with this difference, that in it they pass down in the centre, and not in the bark. If this account should seem more curious than intelligible, to those who happen not to have investigated with any anxiety the modes of growth in trees, there is a difference springing out of this fact we have described, which cannot fail to strike the most indifferent observer. All who have seen a tree sawn asunder, know that the bark and the next layer of wood (alburnum) are soft, and that the tree hardens as we approach its centre. Now, in the pandanus the outer ring is hardest, and the wood grows softer as we get nearer to the middle. The same character belongs to all the palms, In the cabbage-palm, for instance, the outer rind is so hard that at first an axe makes scarcely any impression upon it; and one unacquainted with the nature of these trees would be ready to throw down his instrument, give up the hope of obtaining that delicious vegetable that grows upon its top, and say, "Well, if it be thus hard at the bark, what must it be at the core?" But in these cases want stimulates, and courage likes not to be overcome; the man, instead of despairing, redoubles his efforts, and in a few moments a gap is made in a hard rind, the axe sinks deeper at every stroke, and long before he expected, the wished-for prize lies stretched before him. In cutting off a branch from the pandanus, which averages about two inches in diameter, the knife at first seems to have lost its edge, but with a little patience a notch is made, and the branch falls long before it was looked for. There is another singularity about this tree, wherein it resembles the fig-tree, which is, the occasional descent of an auxiliary stem from an arm to the ground, where it takes root, and in this way affords, at once, both nourishment and support to the trunk and branches. This is of rare occurrence, which the writer did not observe in one tree of a thousand. In the sketch, this auxiliary trunk is seen propping up the branch on the right, which we have drawn of an unusual length, to render the prop necessary. All things, however curious they may be in themselves, lose their interest by becoming familiar, and thus it fared with the writer and his companions: after we had, when plying among the coral islands, seen pandanus after pandanus, occupying the place of some expected rarity, and now and then exercising our patience by tearing our frail flesh with their hooked thorns, we were very glad to meet with a novelty in one that had this auxiliary stem.

The fruit of the pandanus resembles a large pine-apple, when divested of the leafy tuft that surmounts the top, though its size surpasses the largest pine we ever saw. Its colour, when ripe, is yellow, and it is composed of numerous angular drupes, which are placed round the end of a flower-stalk (receptacle) exactly fitting each other, like a piece of mosaic at first; but as they advance in size, they present a number of pyramidal points, as represented in the following figure. At the base of each of these drupes the substance or fleshy part is soft, and of a mealy sweetish taste. In the middle are several long slender nuts, full of meat, which are, with the fleshy substance just mentioned, eaten by natives of these unsheltered islands. In Bow Island we saw an old man feeding upon the fruit of the pandanus. He was sitting in the usual posture of rest, and from time to time bit a morsel off the woody drupe; after which he handed it to a female, who was kneeling by him. This attendant was provided with a large stone, which she employed in crushing the fruits as they were severally given to her; and after, by this means exposing the meat of the nuts, she returned them to her host. The barren flowers are without calyx or corolla: in this they differ from the flowers of the palms. But there is a very large branched flower-stalk, which bears a countless number of stamens (fig. *a*,) which, when fresh, diffuse a most powerful odour. You may



find a thousand trees, without meeting with the barren flowers, as they grow on different trees. The presence of the pollen is supposed to be necessary for the purpose of rendering the fertile flower capable of bringing its fruit to perfection. This pollen, contained in anthers, is a dust of inconceivable fineness. It is not difficult to imagine that this fine subtile powder may not only be diffused over one island, but even scattered over many leagues; and among the various objects on which it lights, may settle upon those very flowers which it was its business and destination to render fertile. By this wise provision, the quantity yielded by one tree compensates for the rarity of its occurrence. Thus, whether it be upon those barren reefs, unbosomed amidst the roaring surf of the vast ocean, or in the most delicious retreats of Asia, the same gracious care watches with impartial eye over the safety and well-being of created things.

It may not be amiss, since we have spoken of one of the principal tenants of the Low Islands, that we should say a word about these islands especially as having had the advantage of being eye-witnesses. It has long been a matter of observation, that the bottom of the sea is diversified with an interchange of hill and dale, like the surface of the dry land. Let us suppose that one of these submarine mountains is volcanic, that it has, like other volcanic risings upon the earth, periodical eruptions, and that after several of these eruptions, the edges of the crater, which are raised by each several discharge, are brought near the surface of the water. The submarine volcano, which we have now supposed, is the basis of all those islands which are indifferently called Low Islands, Coral Islands, or the dangerous Archipelago. Having established a basis, let us look for a superstructure: the crater was near the surface, but what will bring it higher than that level? The well-informed reader anticipates the answer, The madrepores, or various kinds of coral, that fix their dwellings upon the sides and edges of the crater. The gradual increase carried on by the successive propagation of these curious animals, forms a kind of collar about the crater, which presents itself, as a long glacis or sloping ascent, quite round the island. In time, by the accretion of limestone, the edges of the crater are seen above the water, the atmosphere acts upon them, and in a few years a pabulum is prepared for the lesser vegetables; which, by their decay, make provision for those of larger stature, and thus those wide extended rings of habitable land are formed, which we call the Low Islands, and whereon the pandanus is found in great abundance. As among animals, the weaker become the prey of, or labour for the stronger, so in the vegetable colonization, the more inconsiderable, requiring less earth, are first planted; these die, are decomposed, and their elements go towards the formation of a soil, sufficiently deep to encourage and support the germination of larger plants. Thus the work of labouring for others goes on in an ascending series, till in time the stateliest trees are seen upon what, some years before, was a rugged ridge, which more than once, perhaps, tripped up an unwary ship, and shook it to pieces. To get acquainted with the pandanus in its habitats, upon the Low Islands, a botanist always lands at the risk of his life; as a tremendous surf encompasses and beats with unmitigated violence on every side. The writer so narrowly escaped a watery grave, in two instances, that he cannot conclude this short account of a curious tree, without acknowledging that gracious Providence which through ten thousand dangers and troubles preserved him unhurt.

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## CHEMISTRY. No. XI.

### METALS. NO. 1.—GOLD, SILVER, IRON, COPPER, TIN.

When we consider the many important purposes to which the metals have been applied, and their instrumentality in the improvement of the arts, it will not appear singular that the study of their properties should form an important branch of chemistry. At a former period, chemistry was entirely confined to a description of metallic substances and their combinations, and they still retain an important place in the science. Chemists have differed in opinion as to the best mode of classifying the metals; but our limits will not permit us to enter into a detail of their opinions, and we must confine ourselves to an enumeration of some of the most important properties of the more useful metallic substances, with a brief mention of those which are less frequently employed in the arts.

There are forty-one metals, and they are distinguished by their peculiar lustre or brightness, opacity, fusibility, malleability, ductility, and tenacity. They are good conductors of electricity, insoluble in water, and absorb oxygen. These general properties are possessed, in a variable degree, by the different metals; some of them being peculiarly malleable and ductile, while others are of a brittle nature. Some of them possess a powerful affinity for oxygen, while others can absorb it only under peculiar circumstances.

The metals are seldom found in a state of purity, but are generally combined with oxygen, sulphur, the acids, or with other metals. When one metal is found mixed with another, the substance is called an alloy; when with non-metallic bodies an ore. The process by which the metals are extracted from their ores varies according to circumstances, and is known as washing, smelting, or amalgamating.

Gold is the most valuable of all the metals, and is found most abundantly in Peru and Brazil, in South America; though it is also obtained in Siberia, Hungary, some parts of Africa, and in other places. This metal is rather more than nineteen times heavier than water; is the most ductile of all the metals, and at the same time possesses great tenacity, though not equal in this respect to some other metals. Its malleability is so great, that leaves of gold may be formed, having a thickness not greater than 1-282,000th parts of an inch in thickness. It may be melted at an intense heat, 3000° Fahrenheit; is not affected by exposure to the air, and has been preserved at a high temperature in a furnace for some months, without undergoing any perceptible change; it may, in fact, be kept in a fluid state for a great length of time, without a decrease of weight, or the loss of any of its properties. A very intense temperature is required to volatilize it; but this effect has been produced.

Gold will unite with oxygen, and it is easily converted into an oxide when acted upon by a powerful voltaic battery. It will also unite with one or two of the acids, and form salts. It may here be noticed, that when an earth, alkali, or metal unites with an acid, it forms a substance called, in chemical language, a salt. Gold is less hard than an alloy of gold and copper, and the ductility of the metal is destroyed by the admixture of either bismuth, antimony, or lead: a proportion of one nineteen-hundredth part is sufficient to produce this result.

SILVER is a white and sonorous metal, and is found in greater or less abundance, in almost all countries, and is so ductile that one grain may be drawn into a wire 400 feet in length. Its specific gravity is 10½; it possesses great tenacity, melts at 1000° Fahrenheit, may be volatilized, combines with oxygen, and is the most brilliant of all the metals. It is generally alloyed with copper before it is employed in the manufactures, and its hardness is thus greatly increased.

IRON is the most useful and most abundant of the metals, being found in all parts of the world; a circumstance which proves the goodness of the Creator, in providing for the comfort and wants of man. It is of a blueish-grey colour, is capable of receiving a brilliant polish, and, excepting tin, is the lightest of all metals; its specific gravity being 7½°. It is melted at a high temperature; but when heated to redness, two pieces of iron may, by repeated hammering, be perfectly united together. This process is called welding.

Iron is brought into the market in three states. When first extracted from the ore, it is called cast-iron, and contains carbon and oxygen; but by hammering, it may be deprived of these substances, and is then called wrought-iron. If bars of wrought-iron and of charcoal be laid one upon another, and exposed for some time to a considerable temperature, the iron will absorb a portion of carbon, and be converted into steel; a substance which possesses some distinct and important properties. Iron, when united with a certain proportion of carbon, forms carbonate of iron, commonly known by the name of plumbago, or black-lead. When united with silica and alumina, it forms emery; and many useful substances are produced by its combinations with oxygen, sulphur, and other bodies.

COPPER is an elastic, sonorous, ductile, and tenacious metal; melts at the temperature of 1450° Fahrenheit; has a specific gravity of 8½; is malleable, and may be beaten into remarkably thin leaves; in which state it is termed Dutch metal. When combined with oxygen, it forms verdigris; and with sulphuric acid, Roman vitriol. Brass, a useful and well-known alloy, consists of copper and zinc; three parts of the former to two of the latter; bronze and bell-metal are composed of copper and tin.

TIN is found in various parts of Europe and America; but that used in this country is chiefly obtained from the mines of Cornwall. It has a bright white colour, a strong and unpleasant taste, gives out a peculiar odour when rubbed, and has a specific gravity of 7½. It is sufficiently malleable to be beaten into leaves one thousandth of an inch in thickness, is very flexible in its nature, and is distinguished from all other metals by the singular cracking noise which is produced when it is bent. It melts at 410°Fahrenheit, and is serviceable for the manufacture of many domestic utensils, though it is more commonly used to coat iron and copper articles. It alloys with other metals; but its most useful compound is with lead, forming pewter.

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## TEMPERANCE.

Dr. Farre, in answers to his examination by the Parliamentary Committee, stated that he has been forty-one years in medical practice, in different parts of the world. He now practises in London.

Undoubtedly, says he, the gin-shop may be considered as the source of great destruction and demoralization to the poor. I view the gin-shop in every new neighbourhood with very great pain. The gin-shop, rising like a palace, absorbs the wealth, and the health, and the life of the labouring classes. I call them whited sepulchres, full of rottenness and dead men's bones.

The following are the doctor's opinions on the medical use of alcohol:—

In regulating the heart, the physician must be able to force the circulation; and this forcing is done by diffusible stimulants, of which alcohol is one. The average quantity of fermented liquor (not distilled spirit) measuring it by wine, that medical men recommend when it is needed, is two glasses daily. I remember, says he, a patient, who was so recommended, telling me he found himself searching for the largest glasses in the house. I say two wine-glasses of wine; which quantity warms the stomach into a gentle digestion, but is not felt in the way of excitement in the brain. I believe alcohol is wholly unnecessary to persons in health, and that in all cases it should be viewed as a medicine. The best medical rule that ever was given for the use of alcohol, in the form of wine, is given by Paul, when he says, "Use a little wine for thy stomach's sake." This does not necessarily mean the daily use of a little wine: the individual for whom it was prescribed was full of infirmity, and he might require it daily. I am not speaking of the healthy man; the healthy man requires only water, unless his exertion be inordinate. I think the habitual use of spirits, in any degree, pernicious. They should be used only as a medicine. I never prescribe them but as medicine; and I have been often prevented from prescribing them, when I thought them necessary in moderate quantities, for fear of the habit. I believe that the use of stimulants by women, especially of the lower classes, first given medicinally, has a great tendency to bring about habits of drinking. I call the habitual use of these diffusible stimuli, whether spirituous, ethereal, or opiate, with the exception of ammonia, medical dram-drinking; and although the occasional use of the diffusible stimuli be indispensable in medicine, yet if it degenerate into a habit, it inevitably leads on to that result which now engages the attention of the committee. The cholera was not only more fatal to drunkards generally, but fewer recovered under treatment by the diffusible stimulants of alcohol and opium than by a milder and more discreet treatment.

Having been asked whether the addition of water merely, effects any change in the property of distilled spirit, he replied—It does not. Diluted spirit destroys as effectually, though more slowly, than the undiluted spirit; but there is an idea among drinkers that dilution renders it more safe, and I will give an illustration from a drinker:—The chairman of the most notorious drinking-club that, perhaps, ever existed in London, was a ruddy old man at eighty-four. His knuckles were radiant with gout, and his face was glowing with the *acina rosacea* of intemperance, venting itself at his protuberant and fiery red nose, which, though of a prodigious size, and perpetually distilling, was not quite so enormous a nose as the one described by Sennert, which "impeded vision and required lopping." He acknowledged that he had reformed for thirty years of his life; and you may judge what the habit had been by the reform; for his allowance consisted of one pint of brandy a-day, and six glasses of Madeira after dinner; and he maintained that it could not possibly injure him, because he always diluted it to the strength of white wine. This man was called by venders of liquor a decoy, one of the devil's decoys; and emphatically so called. I was curious to inquire how many of his companions (for it was a notorious club) were living. There was not one living; he had buried three sets of them. He presented an example of that constitution which bears high stimulation: and woe be to him who attempts to compeer with such an one!

Being asked whether the stimulus produced by the use of spirits adds any strength to the body, Dr. Farre replied—As a forcing power, it gives, during the state of excitement, increased power; during the state of collapse, diminished power in an extreme degree. In illustration of a similar question respecting the uselessness, and worse than uselessness, of spirituous liquor for persons in health, he related the following anecdote:—I recollect being consulted by a commander of a British merchantman, who was carried into Algiers. The Dey immediately stripped him naked, and chained him to another British prisoner; he placed him on the public works from four in the morning till four in the afternoon; he then was turned into a cell with his naked companion till four in the morning, and there were placed by his side a pitcher of water and a loaf of black bread. I asked him if he could eat it. He said, "Oh, yes; it was very sweet indeed." What did it consist of? It was made of the black wheat of Africa and the vegetable locust; but it was appetite that gave it sweetness. Now, it is remarkable, that this man was a prisoner for nine months, while he was fed on one pound of bread and a pitcher of water per day, and had to perform hard work under such a tyrant; and to my question, "Did you enjoy health?" his reply was, "Perfect health; I had not a day's illness. I was as lean as I could be, but I was perfectly well." When he was set at liberty, and he had returned to British fare, then he had to consult me as a physician.

On the subject of temptations to drunkenness, the doctor said—Drunkenness is the result of habit; the unhappy individual is beguiled into it, and it becomes a vicious propensity, by the law of habit. If I were to illustrate to you how men are entrapped into drunkenness, I would take dealers in fermented liquors, publicans, brewers, and distillers' servants, and travellers. These men become drunkards in the way of their business without intending it. It is a part of their occupation to sell their liquors, &c.; and therefore they take it by way of inducement. I have pretty uniformly found that the habit has arisen from their occupation, rather than from a vicious propensity; and they have been undone before they were aware of it. I remember asking the head of a large gin-shop, what was the inducement to drink among the poor?" He said, "Good fellowship;" and I asked him if he was cruel enough to give them proof-spirits? "Oh, no," he said, "we should burn their insides out; we make it comfortable for them." Thus, even the publicans show a mercy, perhaps a fraudulent mercy, in diluting the liquor; thus rendering it less destructive. I recollect another large gin-shop, where, on being called to attend, I questioned the publican on the same point, and he told me that the Home Secretary was only reconciled to the point, on his assuring him it was little better than strong grog; but the truth is, that the strong grog suffices for destruction, if enough of it be taken, and that enough is taken, we have too many melancholy proofs.

With respect to the extension of good fellowship to domestic life, perhaps heads of families are not aware of the mischief which they inconsiderately do, when, in the warmth of their feeling, they persuade their wives and their children to be partakers of their cups. I remember being called to a female, in the last stage of disorganization of body and demoralization of mind, and she was within a few days of inevitable death. After I had examined the case, and had acknowledged that nothing could be done, the husband took me on one side and said, "Sir, I regret to acknowledge that I am the unintentional cause of this woman's death." He added, "When I married her, she was as lovely and innocent a young woman as I ever beheld; but having been accustomed to a sea-life, and to take my grog with impunity, I persuaded her to drink with me. Two years elapsed before I succeeded, but afterwards I could never get her to leave it off."

Now, that unhappy woman perished, not because she loved the liquor, but because the habit of taking it was established. The law of over-stimulants is this, that the circulation falls off in a greater proportion than it was forced; then comes the collapse, or the depressed feeling, from the abstraction of the alcohol, and then the desire for renewing the dose: but the further law of stimulants is, that the dose must be increased to produce the desired excitement, and thus a fatal habit is established, by which structures essential to life are disorganized; but long before the beautiful structure of the body is disorganized, the mind is demoralized, and the love of truth destroyed.

## THE QUACK DOCTOR.

If you do not know what a quack doctor is, it does not signify, nor would it, indeed, be of any evil consequence if you never should know all the days of your life; but as there is some danger that, at one time or other, you may fall into the hands of quack doctors, if you remain in ignorance of them, so I will, as well as I can, explain, what a quack doctor is, that you may be aware of your danger, and guard against him.

A quack doctor, then, is one who undertakes, generally to cure diseases in a way that no other person can, by some particular medicine known only to himself. He prints handbills, and puts puffing accounts in the newspapers about the many and wonderful cures he has performed, and thus deceives people, easy of belief, by his vain boasting, persuading them that he is astonishingly learned and clever, while at the same time he is often miserably ignorant and unskilful.

If there be one mark plainer than another by which you may discover a quack doctor from a talented physician or skilful surgeon it is this, that he often undertakes to cure diseases, totally different from each other, by the same means. Now this is so barefaced an imposture, that one would wonder where people could be found so simple as not to see through the cheat; yet so it is, such silly people are found, and that in great abundance. As it is my wish that you may not act so unwise a part as these people do, I will endeavour to make it quite plain to you, how very weak and wicked it is to undertake to cure opposite complaints with the same remedy.

Suppose three boys wanted to do three things. One to warm his hands, another to fly his kite, and a third to quench his thirst, and I advised them by all means, to get a good fire as soon as they could, that they might all do what they wanted to do. Now you may see, with half an eye, that though the good fire might do capitally to warm the hands of the one, it would not enable the other to fly his kite, nor the third to quench his thirst. Or, suppose that, instead of a good fire, I recommended them all to use a ball of packstring; why they would be no better off than before: for though one might certainly fly his kite with the packstring, the others could neither warm their hands with it, nor quench their thirst. Should I not, then, think you, deserve to be censured for folly, instead of being praised for wisdom? and so ought every quack doctor in the land to be censured, who undertakes to cure opposite diseases with the same remedy.

Let us suppose, again, that three persons are unwell. One is faint with want and weariness, a second has the rheumatism, a third is afflicted with inward inflammation, and I should be foolish enough to attempt to cure them all by giving them a glass of wine. Now, the wine in the first case, might cheer up the fainting spirits of the sinking person, but it would not be at all likely to relieve the rheumatism of the second; and as to the third, afflicted with inflammation, it might occasion his death. Would you honor me for my knowledge and kindness, or despise me for my ignorance and cruelty? but I need not ask: you would set me down as a man that ought to be avoided. Mind, then, that you avoid a quack doctor.

The impudence of quack doctors is unbearable. One professes to cure almost all the diseases that the body is liable to by a few bottles of a medicine that, in many cases, will do neither good nor harm; while another boastingly undertakes to do the same thing with a box of pills. This impudence and folly might be laughed at, if it did not do so much mischief as it does; but when a quack doctor persuades a poor afflicted being to depend on his uselesss, if not injurious stuff, instead of applying to a skilful professor of medicine or surgery, he is trifling with the life, and sacrificing the happiness of a fellow-creature. And here I would just notice that almost all the tinctures, elixirs, balms, and other wonderful quack medicines you read about, contain a large quantity of spirits or alcohol. Look back to Dr. Farre's evidence, which is on the pages before this article, and be assured that every word he there says about spirits is applicable to these poisonous compounds.

If ever you should be afflicted with disease, at any period of your life, never go to a quack doctor: avoid him as you would plague, pestilence, and famine. Go to one whose days have been devoted to the acquirement of knowledge and skill as a doctor; let him have your money, and with God's blessing on his assistance, you may hope for a cure. Nay, if you have no money to give, do not be down-hearted on that account, for though quack doctors are not fond of giving their advice for nothing, many wise and kind-hearted surgeons and physicians do so continually.

I hate quack doctors, or rather I hate their guilty practices; for I hold it a fearful thing to tamper with the afflicted bodies of human beings. We are fearfully and wonderfully made, and he who pretends to understand, and to relieve diseases when he knows that he is ignorant of them; yea, when he knows that he is living on the very life-blood of his fellow-creatures, has a dreadful account to give of his sinful career.

But though it be, as I said before, a fearful thing to tamper and trifle with men's bodies, it is a still more fearful thing to tamper and trifle with their souls! And, there are thousands who set up as spiritual quack doctors in the world, ever ready to persuade people to take their advice instead of that of the faithful ministers of Christ, who plainly point out the diseases of our souls, and the proper remedies for our sins.

Every one who lives in the world is liable to some particular bodily disease, more than to another, and it is the very same with the soul; we each of us have a besetting sin. These spiritual quacks often try to make people believe that the disease of sin is not so general, or not so dangerous as it really is. Some of these quacks are very ignorant, and others, very designing; be then upon your guard, "for they lie in wait to deceive." Sooner or later they will be found out in their evil practices.

It is enough to sink us to the dust, to know that we are all affected with the leprosy of sin; but it is enough to raise us up with joy, to be assured that there is a great Physician, who cures all who apply to him. He has a fountain open for all uncleanness; he heals every disease, and bids the bones that are broken to rejoice. These things he does without fee or reward, without money, and without price.

This great Physician is the Redeemer of the world, even our Lord and Saviour Jesus Christ. He died for our sins, and rose again for our justification, and now sits on the right hand of God, "able to save them to the uttermost that come unto God by him." I cannot tell you half the wondrous cures he performs by his almighty power: not only "the blind receive their sight, and the lame walk: the lepers are cleansed, and the deaf hear," but the very "dead are raised;" and those who once looked forward to eternal death, he makes partakers of everlasting life. Have nothing to do with the quack doctors of the soul any more than with those of the body. The soul is of too great a value to be trusted in their hands. Go to the great Physician, as you have need of his assistance, for "all have sinned and come short of the glory of God." "If we say we have no sin, we deceive ourselves, and the truth is not in us. If we confess our sins, he is faithful and just to forgive us our sins, and to cleanse us from all unrighteousness," 1 John i. 8, 9.

## LOVE OF GOD.

The great God could have enjoyed the glory of his justice in the everlasting punishment of unthankful man, and yet had glorious creatures enough, the blessed angels, to have been the everlasting partakers and admirers of his goodness; and if there had been yet an absolute necessity for visible intellectual creatures, to be the participants of his goodness and the active instruments of his glory, the same power that created men at first, could have created a new generation of men that might have supplied the defection of our first parents and their descendants. What, then, is the origin of all his goodness to poor sinful man, to purchase such a worthless creature at such an invaluable price as the blood of the Son of God? Nothing but love; free undeserved love; love that loved before it was sought; that loved when it was rejected: "The Lord did not set his love upon you, nor choose you, because ye were more in number than any people; but because the Lord loved you," Deut. vii. 7. He loved you, because he loved you. As Almighty God could not define himself by anything but himself, "I am that I am," Exod. iii. 14, so he can resolve his love into no other motive than his love: he loved you because he loved you. And here is the spring, the fountain of this strange and unheard-of goodness of God in Christ; nothing but the free love of God; "God so loved the world, that he gave his only begotten Son," &c., John iii. 16. "Herein is love, not that we loved God, but that he loved us, and sent his Son to be a propitiation for our sins," John iv. 10. And that very same love that was in the Father to send, was in the Son to come, and to die for us. It was he that loved and washed us with his own blood; washed us because he loved us. When we lay, like Ezekiel's wretched infant, polluted in our blood, Ezek. xvi. 5, 6, when no eye pitied us, then this love of God passed by us, and said unto us, Live; yea, said unto us, when we were in our blood, Live. And when that life was not to be acquired for us but by the death of the eternal Son of God, then to purchase that life for us he sold his own; and to wash us from the pollutions of our blood, freely spent and shed his own. This was "the love of Christ, which passeth knowledge," Eph. iii. 19.—*Sir M. Hale.*

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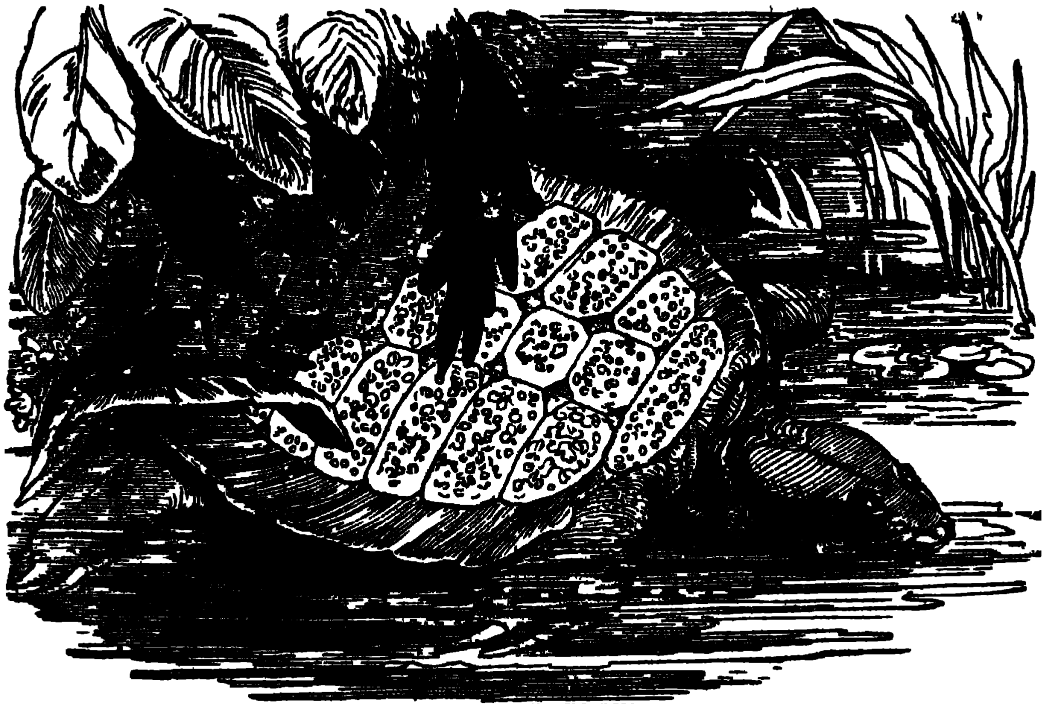

THE TRIONYX SCABRA, A FRESH-WATER TORTOISE FROM SUMATRA.

## ON TORTOISES No I

The tortoises form a very extensive order of the class reptilia, and are too remarkable in their external characters to be confounded with any other group in nature They may be said to be enveloped in an external skeleton, which, like solid armour, affords them security from the attacks of their enemies. This panoply, however, demands a more minute attention Let us then examine it a little in detail A first glance assures us that it is composed of two portions or shields, an upper, which is arched so as to present a convex surface; and an under, which is more or less flat, and which, at least in most of the order, is united at its lateral edges to the convex upper shield, leaving a large irregularly-shaped aperture at each extremity, for the passage and freedom of the head, limbs, and tail, which are found, in most terrestrial and fresh-water tortoises, capable of being completely retracted and sheltered within the borders of the shields. Of these shields, the upper is termed the *carapace*, the lower the *plastron*, or breast-plate The carapace is, in truth, neither more nor less than an expansion of the ribs, (eight in number on each side,) united at their edges by a *suture* or seam: its middle longitudinal portion consisting of the vertebræ of the back and loins, which are consolidated together, so as to be immoveable. This may be easily understood by any one who will examine the shell of the turtle, (*chelonia mydas*,) whose flesh is so great an article of luxury. Internally, therefore, the carapace of the tortoise presents the appearance of simple bone; externally, it is covered with scales, or plates, or skin. If the carapace represents the dorsal vertebræ and ribs, consolidated and expanded, the breast-plate or plastron is analogous to the *sternum* or breast-bone; it is generally made up of nine distinct portions united together, and covered externally like the carapace. Within these two osseous envelopes, are the remaining parts of the skeleton, the scapulæ, the clavicles, and the bones of the pelvis, (those of the head, neck, limbs, and tail excepted,) together with the muscles and viscera.

Tortoises, like the mammalia, have true lungs for the respiration of atmospheric air; their lungs are, indeed, of immense volume, and extend over the greatest portion of the inner surface of the carapace, to which they are attached.

To those among the tortoises whose habits are aquatic, the situation of the lungs is of great advantage: it is a simple and efficient mode of enabling the floating animal to keep, without any exertion, its due position and balance among the rolling waves; for it is evident that the part containing voluminous lungs filled with air, must be perpetually the uppermost in the water.

Mammalia breathe by expanding the chest, that is, by dilating the cavity occupied by the lungs, into which the air accordingly enters, in order to fill up the vacuum which would otherwise be occasioned. Now this action, as is very manifest, supposes a certain degree of mobility in the walls of the chest, or in other words, of the ribs which encircle it, and such is the case; independent of the action of the diaphragm, by which the cavity of the chest is alternately enlarged and contracted, there is an action of the ribs also, through the agency of certain muscles which raise them, while they bring them forward, and depress them, on restoring them to their former position. But the ribs of the tortoise entering into the formation of its solid shield, are fixed and immoveable; no part of the body is capable of being expanded, neither is there any muscular diaphragm parting the chest from the abdominal cavity, by the action of which the lungs may be filled. How, then, is breathing effected? By an act much resembling deglutition or swallowing, and depending solely on the mouth and tongue. The jaws being firmly closed, the cavity of the mouth is dilated, by the drawing down of the root of the tongue, together with the bone (*os hyoides*) which supports it, and the air rushes into the mouth at the same time through the nostrils. The posterior aperture of the nostrils is now closed by the tongue, the root of the tongue is elevated, the cavity of the mouth is diminished, and the air is forced down the trachea into the lungs. This mode of respiration, or rather this deglutition of air, is not peculiar to the tortoises; it is common also to the frog, the toad, and their congeners.

Tortoises, though possessing great strength in their jaws, are not provided with teeth. In most the jaws are clad in an envelope of horn, which renders them not unlike the beak of a bird; in some, however, the jaws are merely covered with skin.

The young are produced from eggs covered with a hard shell like those of birds, and hatched by the heat of the sun in the sand or mud where the female deposits them. M.

The life of this race of beings is of long duration. In the library at Lambeth Palace is the shell of a tortoise brought alive there in 1623, and accidentally killed in 1730. At Fulham Palace, one procured in 1628, died in 1753. In 1813, one was living at Petersburgh, which was known to have been two hundred and twenty years old. Many similar instances are on record. A collection of them by any of our ingenious readers, would be interesting.

(To be continued.)

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## SCRIPTURE EXPLANATIONS.—No. XXVI.

### The "little cloud."—1 Kings xviii. 44.

The Rev. R. Walsh, LL.D., in his narrative of a journey from Constantinople to England, remarks, that it would have been quite impossible for a large city to have existed on the spot where Constantinople is situated, if some artificial means had not been devised to supply the deficiencies of nature, as it regards water. The first of these means are cisterns and wells, constructed at the bottoms of houses, as reservoirs, to save the rain-water that falls in winter; but to a people like the Turks, to whom water is a religious as well as a natural want, and who use it for ablution as well as drinking, it was necessary to have a much more abundant supply; and this is found in the bends or tanks which they have constructed in the mountains, near the shores of the Black Sea. These mountains are the regions of streams and showers; and wherever a small rill is found running into a valley on any elevation, a mound is raised across the lower end, and the water thus obstructed is thrown back, and accumulated till it forms a large, deep, and triangular lake. This mound is generally faced with marble, covered with sculptures of oriental device, and has a very grand and magnificent appearance. Pipes formed of tiles, moulded into tubes, convey the water along the hills; and when a valley interposes, it is crossed by an aqueduct. Some of the aqueducts are very striking and noble in perspective.

I passed the autumn of 1822 near one of the largest and most important of these reservoirs. The summer had been remarkably dry: and it appeared, from a table that I kept, that it had not rained from the 4th of April to the 2nd of November, with the exception of a few passing showers. The water in the tanks or bends became low and muddy, and the Turks took the alarm. The water engineers were sent out, and I accompanied them to some of the bends; they measured the quantity of water, and they found no more than sufficient to supply the city for fifteen days! Judge of the consternation of seven hundred thousand persons suddenly deprived of an element essential not only for domestic uses, but religious also, and having no other possible mode of obtaining it. Prayer was offered up in the mosques, and the sky was anxiously watched. The immutability of things in the east, and the illustrations given to the writings of former times, is not the least pleasure a person experiences in these countries. The approach of rain is always indicated here as it was in Syria, by the appearance of a small, dark, dense, circumscribed cloud, hanging over either the Euxine or Propontis. A dervish stands on the top of the giant's mountain; and when he sees a cloud, he announces its approach, like Elijah from the top of Carmel. I one day climbed to the same place, and saw the dervish on the watch, and "I looked towards the sea, and beheld a little cloud rising out of the sea, like a man's hand, and gat me down that the rain stopped me not." In effect, it immediately followed, and the Turks were relieved from a very serious cause of anxiety.

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## THE ENERGY OF A MOTHER.

One of the small islands in Boston Bay was inhabited by a single poor family. The father was taken suddenly ill. There was, of course, no medical aid to be obtained. The wife, on whom every labour for the household devolved, was sleepless in care and tenderness by the bedside of her suffering husband. Every remedy in her power to procure, was administered, but the disease was acute, and he died. Seven young children mourned around the lifeless corpse. They were the sole beings upon the desolate spot. Did the mother indulge the grief of her spirit, and sit down in despair? No. She entered upon the arduous and sacred duties of her station. She felt that there was no hand to assist her in burying her dead. Providing as far as possible for the comfort of her little ones, she put her babe into the arms of the oldest, and charged the two next in age to watch the corpse of their father. She unmoored her husband's fishing-boat, which but two days before he had guided over the sea to obtain food for his family. She dared not yield to those tender recollections that might have unnerved her arm. The nearest island was at the distance of three miles. Strong winds lashed the waters to foam. Over the loud billows, that wearied and sorrowful woman rowed, and was preserved. She reached the next island, and obtained necessary aid. With such energy did her duty to her desolate babes inspire her, that the voyage which depended on her individual effort, was performed in a shorter time than the returning one, when the oars were managed by two men, who went in to assist in the last offices to the dead."

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## THE BENEFITS OF THE SABBATH

The institution of the sabbath may be esteemed one of the greatest blessings conferred upon man.

This day is Divine in its origin, inasmuch as it was ordained by God. It is likewise holy in its nature, as it was sanctified or made holy by God, Genesis ii. 3. It is also holy in its designs, as it was a day appointed by God to be separated from others for holy service; a day in which man should go up to his sanctuary, and there render acceptable service to him, and where he might receive such supplies as were every way calculated to preserve him amid the manifold temptations to which he is exposed.

It was also designed as a day of rest from the cares and turmoils of human life, and in which man should leave the engagements of this lower world, and seek those more sacred employments in which the holy soul delights.

To the christian this is a day of peculiar enjoyment, after the toilsome engagements of the week; and especially if he has been assailed by tormenting perplexities, by persecution, or other calamities to which his soul is subject: how joyfully would he hail the return of the sabbath as a day of spiritual rest, in which he could (being released from the toils of time) rise upon the wings of faith, and catch a glimpse of that world, whither his soul is longing to take its flight, and with whose inhabitants he would delight to mingle, and to dwell in paradise for ever beneath the smiles of a reconciled God. H. J. T.

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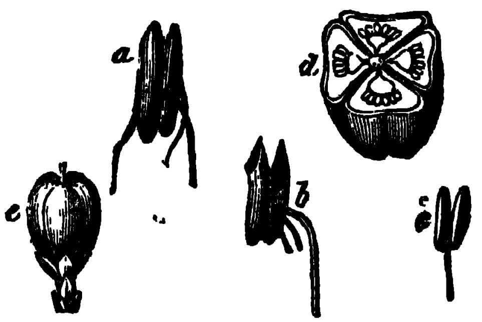
## BOTANY.—No. VII.

### ERICÆ.

This order takes its type and exemplar from the heaths, which are old acquaintances of every one who has taken an excursion upon any of our heaths, commons, and other open grounds. There is a very beautiful characteristic of this order, which the lover of plants will be delighted in finding, if he examines the anthers, or those little heads, which our forefathers called aglets. The distinction consists, in the first place, in the presence of two threadlike appendages hanging from the lower part of the anthers, as shown in figure *a*, which exhibits a back view of the anther.



Anthers generally consist of two cells; and here we see that the cells or little pouches are peculiarly distinct from each other. The second point of distinction is in the manner in which these anthers shed their pollen, namely, by two little pores or openings at the top, as is represented in figure *b*. Figure *c* represents the common, or, to speak more properly, the general form of an anther; the black descending line that divides each cell, denotes the more frequent manner of bursting, in order that the pollen may be shed. The common heath, which may be met with in all places where the soil is sandy and barren, will afford a specimen to exemplify what has just been said about the peculiar structure of the anthers, while the result of the examination, especially if the eye be assisted by a magnifier of small power, will fairly recompense the collector's curiosity and trouble. The seed-vessel, figure *e*, of the ericæ, affords another mark for discrimination; it is superior, that is to say, above the calyx, within the hollow of which it is found. The valves, or folding pieces that compose the walls or sides of the seed-vessel, are either four or five in number; from the middle line of each, a partition, which reaches to the central column, is seen to originate. These partitions are represented in figure *d* of the preceding cut. The union of two valves is shown by the front descending line; at this line the valves part, and give exit to the minute seeds. The little fan-shaped processes, drawn in the void spaces, represent the seeds resting in four bundles upon their four collective bases. The corolla consists of four or five petals, more frequently adhering by their edges, and forming a tube or urn-shaped cup. The calyx is not in distinct leaves, but generally divided into four or five deep segments. There is often a beautiful harmony in the number of members which compose each separate portion of a flower. In the heath we have, for example, four segments of the calyx, four segments of the corolla, and twice four, or eight stamens. In the andromeda, or wild rosemary, we have five parts in the calyx, five teeth in the edge of the corolla, and twice five, or ten stamens. In the same plant we find also five cells in the seed-vessel, as in the heath we have four cells to correspond with the fours in the rest of the parts.

### Examples

*Erica.*—The divisons of the calyx so detached from each other that they may be said to be leaves rather than segments. These are four in number. Corolla four cleft; filaments originating from the receptacle or base of the flower, and not from the corolla; anthers with an opening at the top, as we have described them, with a pair of appendages at the base; seed-vessels with four cells or compartments.

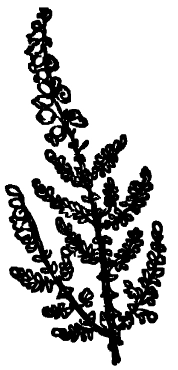
*E. vulgaris*, common heath or ling.—Corolla, bell-shaped, with a double calyx; leaves opposite, in pairs, and shaped like an arrow-head at their base. The beautiful little appendages are distinguished by an appropriate name, aures; if examined through a glass, will be found to have their edges finely toothed, like the edge of a saw.

*E. tetralix,* cross-leaved heath.—The leaves, instead of being in pairs, as in the preceding species, are collected into warps or fours; whence the specific name tetralix, which implies a whorl of four leaves, or a coil of four turns; common on moist heaths.

*E. cinerea,* fine-leaved heath.—Leaves in leashes or threes, smooth, with their edges entire. The flowers are in umbels; as in the tetralix, or last species. If the calyx be closely examined, the edges of the segments will be seen to be finely sawed. The teeth upon the auris are more distinct than they are in the common heath.

By way of embellishment as well as instruction, we will give cuts of two foreign species of ericæ.

*E. empetrifalicc,* crowberry-leaved heath.—Corolla rough, pitcher or urn-shaped; border bent back and spreading. Stigma appearing beyond the corolla. This species was first found by Masson, growing spontaneously, near Bay Falls.



2. *E.ciliaris.*—Leaves egg-shaped; corolla smooth, tube egg-shaped and pyramidal, with upper side ventricose, or bellied; leaves in threes.

*Andromeda.*—Distinguished from the ericæ, or heaths by the prevalence of this number five instead of four. For in this genus, the calyx is parted into five divisions; the egg-shaped corolla has its mouth with five clefts; and the stamens are ten or twice five in number. The capsule also has five cells; but the anthers are provided with aures, as in the heath.

*A. Polifolia,* wild rosemary.—Peduncles, or flowering stalks, growing in a close bundle; leaves alternate and not in pairs, threes, or fours, as in the heaths; they are lance-shaped and rolled back upon themselves; found on turf bogs.

There is a remarkable fact connected with the history of these two genera, ericæ and andromeda. The erica numbers more than two hundred species, but they are all confined to the old continent, so that when we find a heath-like plant upon the northern parts of the new continent of America, we may be assured, without examination, that it is not an erica, but generally a species of andromeda.

*Arbutus.*—Calyx five parted, corolla egg-shaped, with the mouth five cleft, as in the andromedâ. If it be held up between the light and the eye, the base will be perceived to be pellucid; the germen, instead of turning into a dry ripened capsule, becomes a soft, pulpy berry, with five cells.

*A. unedo,* common strawberry-tree.—Stem rising to the consideration of a tree; leaves smooth; flowers in a loose cluster, or panicle, terminating the branch. Grows in the West of Ireland.

*A. uva ursi,* bear-berries. Stems procumbent or resting on the ground; leaves smooth, with their edges entire, veined like net-work underneath. Found on heaths.

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## OLD HUMPHREY ON CONSISTENCY.

THERE is a term used among artists called *keeping,* which means that the tone and effect of the different parts of a picture should be in agreement with the whole; now, keeping is quite as necessary in passing through life, as in painting a picture.

A man who wears a ring and a gold chain should not be out at the elbows. Nor would it look well to see a minister of the gospel dressed in a soldier's uniform; these things would be out of order, out of propriety, out of keeping; there would be no consistency in them.

But there is a keeping, a consistency in things as well as in persons, in books as well as in men. I was led into this train of thinking by taking up a religious magazine the other day, whose outside cover and inside contents were so out of keeping, that according to my wonted custom, I sat me down to examine the subject a little more closely.

As Old Humphrey never willingly gives offence, nor intentionally brings an unnecessary blush on the face of any one, so is he the more free in his observations. If he sees a friend wearing a lamb's-wool stocking on the wrong side; or, a stranger, who has set his back against a whited wall, he can no more help pointing out the defect, than he can help warming his hands in cold weather.

The magazine, as I said, was a religious one, and I took it up with that sort of feeling which harmonized with what I expected to find in the work itself. The title of a book is often, to a reader, what the tuning of a violin is to a musician; it prepares him to enter on his undertaking in a proper manner. Unfortunately, the magazine had six or eight leaves of advertisements at the beginning and ending, of so odd and mixed a character, that the mind of Old Humphrey, too often affected with trifles, was sadly deranged by them. If, in going into a place for Divine worship, you were to find two buffoons standing in their motley dress, arrayed in their cap and bells, it would perhaps unfit you for the service, just the same as these advertisements unfitted me for the profitable reading of the contents of the magazine.

The leaves in their very colour were at war with the tone of my mind; there was nothing sober about them: one was a deep blue, another a fiery red, and a third a frightful yellow; but the colour of the leaves was a trifle compared to their contents. It was well enough to advertise "Prayer Books and Homilies," but what had they to do with "Rowland's Kalydor," his "Pearl Dentifrice," or his "Macassar Oil?" To put into the same page "Histories from Scripture," and "Old Hock, fine crusted Port, straw-coloured Sherry, and exquisitely sparkling Moselle," seemed a little out of order. What affinity, what possible connexion could there be between "Watts's Psalms and Hymns," and "Imperial Saxony Cloth, Canton drill Trowsers and Petersham Great Coats?" These things, to say the least of them, were sadly out of keeping; they were not consistent.

So long as human beings remain such poor infirm mortals as we are, so long will it be necessary to pay some attention to those things that affect us. Who is there who could read a pious commentary in a proper frame of mind, after running through a whimsical puff on "Improved Periwigs?" Or turn with becoming gravity to the spiritual food provided by Fuller and Flavel, Boston and Baxter, from a paragraph written in high commendation of "Pickled Gherkins, and Potted Yarmouth Bloaters?"

It may be that I am a little fanciful—many old people are so; but every thing that I read affects me for some time after, and therefore it was that the strange mixture of advertisements on the outside of the magazine, disqualified me altogether from reading the inside with advantage.

Old Humphrey wanted to enter into the marrow of the work; but he was so pestered with the strange medley of "Artificial Teeth," and "Steam-cooking Kitchens;" "Quarto Bibles," and "Buckskin Breeches;" "Fountain Pens," "Tallow Candles," "Beaver Bonnets," and "Sabbath Meditations;" "Irish Linens," "Cheddar Cheese," "Religious Tracts," and "Cure for the Tic Doulourеux;" "Soda Water," "Fire Escapes," "Sacred Classics," and "Patent Chronometers," that he was fain to shut up the book altogether, till the hodgepodges had subsided in his mind.

A great deal more might be said on this subject; but, to confess the truth, Old Humphrey himself is often complained of as being sadly out of keeping; sadly inconsistent. He is blamed, and with too much reason, for letting the liveliness of his disposition peep through some of his most serious remarks. He goes from a cheerful observation to a text of scripture too suddenly; and, therefore, knowing his own infirmity, he ought not to be severe on the infirmities of others. He will say no more, then, about the medley of advertisements on the covers of the magazine, than this, that he hopes what has already escaped him is not out of keeping with good nature and christian affection, and it may suggest to some whom it may concern, a useful hint on consistency.

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## THANKFULNESS.

Oh, be ye thankful. I feel that I have not said enough on that word of the apostle's, "I thank God;"—and I cannot. Let your gratitude to Christ supply my omissions. Were I to speak for hours, I could not fully show your cause for thankfulness. Be thankful through life for every deliverance in conflict and temptation. Be thankful in death for such a Deliverer from the last enemy. Be thankful, throughout eternity, to God, through Jesus Christ our Lord!—*Hambleton.*

## INSECTS. No. XXXVIII.

### *Hearing.*

(Continued from page 141.)

It seems fair to suppose, from the variety of sounds produced by insects, that they are intended as signals to their companions, who must, of course, possess the organs of hearing. The address of the poet to the cricket, one of the creatures remarkable for such sounds, is very pleasing:—

Little inmate, full of mirth,
Chirping on my kitchen hearth,
Wheresoe'er be thine abode,
Always harbinger of good,
Pay me for thy warm retreat,
With a song more soft and sweet;
In return thou shalt receive,
Such a strain as I can give.

Thus thy praise shall be express'd,
Inoffensive welcome guest!
While the rat is on the scout,
And the mouse with curious snout,
With what vermin else infest
Every dish, and spoil the best;
Frisking thus before the fire,
Thou hast all thy heart's desire.

Though in voice and shape they be
Form'd as if akin to thee,
Thou surpassest, happier far,
Happiest grasshoppers that are;
Theirs is but a summer's song,
Thine endures the winter long,
Unimpair'd, and shrill, and clear,
Melody throughout the year.

The celebrated naturalists, Linnæus and Bonnet, were disposed to consider insects as deaf; but the knowledge of Shakspeare was more accurate when he made Mamilius say,

. . . . . . I will tell it softly,
Yon crickets shall not hear it.

As soon as it becomes dark, the chirping of crickets increases, and they come running forth, often in great numbers, from the size of a flea to that of their full stature. We speak now of the hearth-cricket, (*acheta domestica;*) both this and the field-cricket (*acheta campestris*) are sometimes kept for their music; and the learned Scaliger took so great a fancy to their song, that he was accustomed to keep them in a box in his study. It is said, that in some parts of Africa they are kept and fed in a kind of iron oven, and sold to the natives, who like their chirp, and think it is a good soporific.

The female cricket is mute. The instrument on which the male plays, consists of strong nervures, or rough strings in the wing-cases, by the friction of which against each other, a sound is produced and communicated to the membranes stretched between them, in the same way that the finger produces vibrations on a tambourine, which are diffused over its surface.

The male tree-hopper, *cicada*, has a curious instrument of sound. He is furnished with a pair of drums, one on each side, consisting of two large plates, oval or circular in some, and triangular in other species, fixed to the trunk between the belly and the hind legs. When this exterior membrane is raised, a cavity is brought into view, a part of which seems to open into the belly, and another part to be covered with a second membrane, much more delicate than the exterior one, tensely stretched, and irridescent, and in the middle there is a horny plate, placed horizontally along the bottom. All this, however, seems only a secondary portion of the instrument; for the sound is in the first instance produced by a bundle of muscular strings, which are attached at one extremity to another membrane in the interior, obviously the true drum; for when Reaumur pulled the strings, and let them go again, the sound was produced, even after the insect had been a long while dead. These muscles, indeed, are so attached to the under concave surface of the drum, that when they pull it downwards, and let it jerk quickly back again, a vibration is produced; the sound issues through an opening contrived on purpose, like the opening in our own larynx, or the sound-hole in a violin.

Some grasshoppers were great favourites with the ancients, who often kept them in cages for the sake of their song. They were supposed to be perfectly harmless, and to live on dew. One poet calls the grasshopper "the nightingale of the nymphs;" and another styles it "the sweet prophet of the summer." So attached were the Athenians to some of these insects, that they fastened golden images of them in their hair; addressed them in the most endearing terms; and from this we may gather that their notes were sweet. Indeed, the sound of them and of the harp were called by one and the same name. A grasshopper sitting on a harp was the usual emblem of music, which was thus explained:—Two rival musicians, Ennomus and Ariston, were contending upon that instrument, when a grasshopper flying to the former, and sitting on his harp, supplied the place of a broken string, and secured to him the victory!

At Surinam, the music of one species is still supposed to resemble so much the sound of a harp, or lyre, that there they are called harpers.

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## CHANCE.

"It happened so," said an infidel, upon hearing the relation of a circumstance similar to the following:

A pious young man, in consequence of a series of misfortunes, was reduced to great poverty and distress, but his confidence in God was unshaken. A few weeks since, he entered the room where I was, pale and pennyless; it was then about ten o'clock: he told a friend of mine, who was standing by my side, that he had had no breakfast that morning, and looking up, with tears in his eyes, said, "I left a piece of bread at home, about the size of my two fingers, for my wife; and her dear little infant is dying of want;" but, said he, with a smile upon his wan countenance, "I know the Lord will provide; I am sure he will." "You will take some dinner with me to-day," said Mr. R.; he, of course, assented, and while he was sitting at dinner, a letter was delivered, directed to Mr. H. He opened it, and found 10*s*. inclosed, and was also informed that if he called that day week at O—— street, he should receive another 10*s*. With a countenance deeply impressed with emotion, the starting tears of gratitude flowed freely down his cheeks; and turning to Mr. R., he said, "Did I not tell you the Lord would provide?"

That morning the distressed Mr. H. had called upon a person, from whom he received no relief, but to whom he related the situation in which he was placed. Shortly after he had left, a humane gentleman called upon this person, from whom he received an account of the distressed circumstances of Mr. H. "O, if I had been here," he replied, "I would have given him 10*s*." "You will find him at Mr. R.'s," said the person who had related the facts of the case to him; he then immediately sent off a note with the sum inclosed.

Let the infidel say, this was "all chance," "that it happened so;" but let him know, that although the rain descends upon the evil and the good, upon the just and upon the unjust, yet God bestows special favours upon those that love and serve him.

A. G.

## THE BRITISH EMPIRE.

"My brethren," remarks bishop Heber, in a discourse delivered in India, "it has pleased the Almighty to give that great, valiant, and understanding nation to which we ourselves belong, an empire in which the sun never sets, a commerce by which the remotest nations of the earth are become our allies, our tributaries, I had almost said our neighbours, and by means (when regarded as human means, and distinct from his own mysterious providence) so inadequate, as to excite our alarm as well as wonder, the sovereignty over these wide and populous heathen lands. But is it for our sakes that he has given us these good gifts, and wrought these great marvels in our favour? Are we not rather set up on high in the earth, that we may show forth the light by which we are guided, and be the honoured instruments of diffusing these blessings which we ourselves enjoy throughout every land, and in every distant isle which our winged vessels visit? If we value, then, (as who does not value?) our renown among mankind; if we exult (as who can help exulting?) in the privileges which Providence has conferred on the British nation; if we are thankful (and God forbid that we should be otherwise) for the means of usefulness in our power; and if we love (as who does not love?) our native land, its greatness and prosperity, let us see that we, each of us in our station, are promoting to the best of our power, by example, by exertion, by liberality, by the practice of every christian virtue, the extension of God's truth among men, and the honour of that holy name whereby we are called. There have been realms as famous as our own, and (in relation to the then extent and riches of the civilized world) as powerful and as wealthy, of which the traveller sees nothing now but ruins in the midst of a wilderness, or where the mariner only finds a rock for fishers to spread their nets upon. Nineveh once reigned over the east; but where is Nineveh now? Tyre had once the commerce; but what is become of Tyre? But if the repentance of Nineveh had been persevered in, her towns would have stood to this day. Had the daughter of Tyre brought her gifts to the temple of God, she would have continued a queen for ever."

JOHN DAVIS, 56, Paternoster Row, London.
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# THE WEEKLY VISITOR.

NUMBER CXLVIII.] TUESDAY, JUNE 16, 1835. PRICE ONE HALFPENNY.

DIFFERENT KINDS OF TORTOISES

## ON TORTOISES. No. II.

(Concluded from page 210.)

IN our preceding paper we entered into a few details on the general characters of the tortoises, as they constitute an order distinguished by striking peculiarities of form and structure. We shall now proceed to explain the more important of those differences which form the grounds of their separation into subordinate groups. We may premise by observing that they may be divided into land tortoises, fresh-water tortoises, marine tortoises or turtles, and soft tortoises.

The land tortoises, of which the Greek tortoise, (*testudo Græca,*) and the gigantic Indian tortoise, (*testudo Indica,*) are examples, are distinguished by the solidity of their osseous investment, and the arched form of the carapace, which is united by nearly the whole of its lateral margins to the plastron. The limbs are short, thick, and clumsy, the feet appearing merely as the abrupt terminations of them, and to be recognised as such only from the circumstance of being provided with short toes, (five before, four behind,) armed with stout nails. The skin of the limbs and neck is course, hard, and intersected by numerous fissures. Their food consists of vegetable matter. Their actions are slow, and their pace an awkward crawl. Many are distinguished by the beauty and regular distribution of the colours with which their shell is adorned. Some have the anterior part of the plastron moveable by means of a hinge, stretching across, so that when they retract their head and arms, they can close the aperture, and shut themselves in. Such form the genus *pyxis*. In another genus, *kinixys*, the posterior part of the carapace is moveable.

The land tortoises are most, if not all, hibernating in their habits; at least they pass a portion of the year in a state of lethargy; having previously dug a hole in the ground for their reception.

The fresh-water tortoises are distinguished from the land tortoises by their flattened form, from the carapace being less arched, and less stout, its osseous stratum being in general comparatively thin. In addition we may observe, that the toes are thoroughly developed, terminated by long nails, and united by intervening webs, enabling them to swim with great facility. Among the fresh water tortoises, or *emydes*, are a group having the plastron so divided by a transverse hinge, as to be capable, after drawing in the head, limbs, and tail, of shutting themselves completely up; hence they are termed box-tortoises. In another group, on the contrary, the tail is so long, and the limbs so voluminous, as to render it impossible for them to be withdrawn beneath the buckler. Of this group, the *chelydra serpentina* is an example. It is a large tortoise of rapacious habits, inhabiting the rivers of the warmer parts of the American continent, and living upon fish, small aquatic mammalia, reptiles, and even birds. Indeed, as it respects the food of the emydes, or fresh water tortoises in general, we immediately notice a departure from the vegetable diet of their terrestrial relatives. With increased activity, and consequently an increased facility of procuring food, we find the emydes all carnivorous; their prey consisting of insects and their larvæ, small fishes, reptiles, &c. Many, as the emys picta, emys pulchella, &c, are remarkable for their varied and beautiful colours. Two species, or perhaps varieties of one species, (*emys orbicularis*,) are found over the whole of the south of Europe, and as far north as Prussia. They are gregarious in their habits, and feed on frogs, fish, &c.; their flesh is highly esteemed as nutritive and delicate food.

The marine tortoises or turtles next demand our notice. In these we also observe a depressed form of carapace, which is too limited to protect either the head or limbs, while the plastron is still more circumscribed, and irregular in figure. The feet no longer retain any claim to that term, but are moulded into true paddles, in accordance with the completely aquatic habits of their possessors. On land the turtle shuffles along like a seal: in the sea it is an active swimmer. The skull in this group of tortoises offers too remarkable a peculiarity to be passed by. It is vaulted over by a sort of helmet, dense and solid, formed by a production of the bones of the face, between which and the true skull, inclosing the brain, there intervenes an enormous space filled by muscles, to which this osseous envelope may be considered as a sort of carapace. Hence the skull of the turtle appears much larger than it is in reality; the brain being very small, and its true osseous covering in proportion. It is to this group that two of this most interesting order belong; one the celebrated green turtle, (*chelonia mydas* or *viridis*;) the other, the tortoise-shell turtle (*chelonia imbricata*.)

The green turtle is well known; it abounds in the regions of the torrid zone, and is gregarious in its habits, feeding on sea-weed and other marine vegetables. Its eggs, which are deposited in the sand, are as highly esteemed as its flesh. This species often attains to the weight of five or six hundred pounds; so that to lift and secure one, by tying it to a clump of wood on shore, four men are not unfrequently necessary. It obtains the name of green turtle, from the colour of its fat.

The chelonia imbricata is little inferior in size to the common or green turtle, and is found in nearly the same latitudes. Valued for the sake of its scales, which constitute the costly "tortoise-shell," it is taken in great numbers on the island of Ascension; a place which appears to be a sort of annual rendezvous for thousands, which traverse leagues of the ocean in order to deposit their eggs on its shores. The men employed in this business, watch their opportunity (when multitudes, under cover of night, have ventured from the water to the beach) to run in among them, and turn each victim upon its back, in which position it is utterly unable to move: when a sufficient number are thus made prisoners, they are collected and shipped.

Our last group contains the soft tortoises, so called because a soft skin, in place of scales or horn, envelopes their carapace and plastron. They are aquatic in their habits, frequenting fresh waters, and, like the emydes, have the feet webbed; but three toes only on each foot are furnished with nails. Both the carapace and plastron are flat, and very limited; a great portion being simply cartilage instead of bone. The nose is elongated, and the tail is short. Of this group (trionyx) the species are limited in number, but widely distributed. They are found in Java, in the Ganges of India, in the Euphrates, in the Nile, in the rivers of Carolina, Guiana, and other hot parts of America. They attain to large dimensions, and are ferocious in their habits and manners; seizing fish and aquatic birds, on which they feed. One, the trionyx Ægyptiacus, is much regarded in Egypt, from the services it renders in devouring the young and eggs of the crocodile. Another, the trionyx ferox of America, lies in ambuscade among reeds and herbage, and seizes its prey unawares; birds, small quadrupeds, reptiles, and young alligators, thus fall victims to its ferocity.

The species in the engraving of our last Number, is the trionyx scabra from Sumatra. Closely allied to the present group, and hardly to be separated from it, is the *chelys fimbriata*, or matamata of Guiana. The carapace is covered with pyramidal points. "It inhabits the fresh-water ponds and rivers near Cayenne, where it conceals itself under the leaves of aquatic plants, exposing only the extremity of its nose, which, from its length, resembles a proboscis: in this position it awaits the approach of young birds, and small aquatic animals, which it seizes as they pass near it." This singular tortoise differs from all others in this respect, that its mouth, which is very wide, instead of being terminated by a horny substance, is formed with fleshy lips, as in the *batrachia*, (frogs, &c.) Here we close this general outline of a race among the most remarkable of the works of the Almighty, which speak of his power, as it is no less displayed in the diversity than in the strangeness of living creatures. M.

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## ORIGIN OF THE RELIGIOUS TRACT SOCIETY.

[From "Leifchild's Life of Hughes."]

In the spring of 1799, a new society, had risen into existence. Its beginning was small, but its latter end has greatly increased. It then resembled the spring-head of some mighty river, hardly awakening notice at its first bubbling up, but increasing its waters, forming channels in every direction for their flow, and swollen by an accession of tributary streams, enriching, fertilizing, and refreshing, by its pure and vital current, almost every country of the globe. This was the "Religious Tract Society." It originated in a suggestion from the late Rev. G. Burder, who stated from the pulpit at a missionary meeting, in Surrey Chapel, in May 1799, that he wished to form a society for the publication and sale of religious tracts, and invited the ministers present and others who were friendly to such an object, to assemble the next morning to converse upon it at the St. Paul's Coffee House.

When it is observed that Mr. Hughes was in the place of worship at the time, it need hardly be added, that he was the next morning at the proposed meeting. After some preliminary conversation, Thomas Wilson, Esq., took the chair, and by him our friend was requested to lead the devotions of the assembled group on so novel and interesting an occasion. The disclosures of the last day will alone reveal how fully the pertinent and comprehensive requests then preferred have been answered.

Of the sub-committee immediately formed, to mature and carry into effect the suggestions offered, Mr. Hughes was one; and at the formation of the society was appointed its secretary; which office he continued to hold till his death, a period of thirty-four years. The first account of the plan of the society, together with an address to the public on its behalf, was drawn up by him. There occurs in this address the very principle on which afterwards another and still more magnificent institution was to be built; namely, a principle of conciliation, by way of securing the co-operation of all denominations of christians in the circulation of pure truth.

The institution was soon in operation. Tracts were written and published, and the society quickly assumed that form to which permanence, unanimity, and unbounded utility have been given, under the auspices of Him who is the Originator of every good purpose. At the committee meetings, Mr. Hughes was ever present, and ever ready with his advice, co-operation, and pen. That pen furnished several of the early tracts; a list of which is given below,* and of which evidence has not been wanting of their successful influence; particularly the one addressed to unfortunate females. In the judgment of the committee respecting the tracts that were submitted to their inspection, the literary acquirements and theological knowledge of Mr. Hughes were of great use. If he were somewhat over-scrupulous about the sentiments, and somewhat hypercritical about the style, and if his extreme caution and fear of making an enemy to the institution, might sometimes hold the society back where a bolder hand might have pushed it forwards to advantage, yet these very qualities may have contributed in no ordinary degree to insure its safety and growth in its infant state, and to mature its powers to their present strength and usefulness.

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* "To a Youth on Purity;" "To the Unfortunate Female;" "To a Prisoner;" "The Importance of Sobriety;" "The Better Gift;" "To the Spectators of an Execution."

What sacred festivals to him were its annual meetings, and even its more frequent and toilsome ones for business! So great was the congeniality of spirit between the different members of the committee, that he went to them always rather as repairing to the enjoyment of a repast than the performance of a duty. "Dear, very dear to memory," says one of the survivors, "are these meetings." But who, however grand the scale on which his conceptions were accustomed to be formed, could have anticipated for the society in so short a time (the age only of one generation) so rapid and vast a growth from its humble beginnings to its present magnitude?

It was, no doubt, a source of pure and high gratification to the heart of Joseph Hughes to be able to inscribe in the first annual report of this society, that it had printed and distributed two hundred thousand tracts in the English language only, and received in subscriptions four hundred and sixty-seven pounds. But what must have been the holy ecstacy of that same heart, when it was inscribed in the last report but one, that upwards of fourteen millions of tracts had that year been distributed in nearly eighty different languages of the world? and that its cash receipts for that year had amounted to more than forty thousand pounds?*

### ANECDOTE.

On one of Mr. Hughes's journeys he found by his side upon the coach a grave and respectable-looking person. In conversation on topics of general attention, they soon came to the Bible Society. His companion launched forth, in vituperative terms, on its Utopian character, and especially on its lavish expenditure; noticing in a marked way the needless and extravagant travelling-expenses of its vaunted secretaries, as well as their enormous salaries. No one, from Mr. Hughes's countenance and manner could have conjectured that he was a party concerned. "But what," he mildly expostulated, "would be your conclusion were you informed that their services were gratuitous; and that, with a view of curtailing as much as possible the expense of travelling, they usually, even in very inclement seasons, fix on the outside? as," he added, "one of them is now doing before your eyes!" The fact and the tone in which it was announced, with the friendly conversation that ensued, converted an enemy into a friend.

### BOTANY. No. VIII.

### LEGUMINOSÆ.

The plants that compose this very natural order, are among the most familiar objects of our acquaintance; for no person is so unread in the science of herbs, as not to remember and distinguish those vegetables that yield us beans and peas for our tables. The term at the head of this article, which stands as the general denomination of a very numerous and important group of genera, is taken from the Latin term *legumen*, which means a pod. That particular kind of seed-vessel, which we call a pod, forms an obvious characteristic of every plant belonging to this order. But there is nothing that contributes more to the accuracy of conception, than to settle the limits of every term used in treating a subject of science, by a previous definition. In compliance with this useful practice, we will define, with concise and botanical strictness, what a correct notion of a pod is, though we suppose all our readers to have been long familiar with the term. A *legumen* or pod, is a solitary seed-vessel, consisting of two valves or sides, without any partition extending lengthwise from end to end, dividing it into two cells. Another essential character is, that it bears its seeds along one of its margins only. The student well remembers, without question, that the seeds within the shell or husk of a pea, are placed along the inner edges of one seam only. In his progress, he will find that these distinctions, however inconsiderable they may appear at first, are of the greatest importance. If an English term is preferred, the plants of this order might be denoted by the general name of pulse, a term that will perhaps recommend itself to the scripture reader, since it is ultimately derived from that Hebrew word which is usually translated beans.

There is another ready and a constant mark of distinction belonging to the members of this order, which is the peculiar structure of that part of the flower which is called a corolla. If the reader looks at the following fig. *a*, or the blossom of the whin, (which flowers in winter,) he will perceive that it consists of four distinct parts; the upper division, which is without a fellow in the same blossom, and is called, from its position and figure, a standard. This part, however, varies in size, from being the most showy expansion in some plants, to the most inconsiderable rudiment in others. As we descend, we meet next with a pair of petals, which, from being placed one on each side, are called wings. And lastly, to the lowest division, which is called the keel. This keel is, we see by the inspection of the figure, composed of two petals, which adhere to each other by their lower edges. The kind of blossom just explained, was designated by our countryman, Ray, papilionaceous or a butterfly-shaped blossom. There is a great diversity of form and position in the flowers of the leguminous plants; but if the different sorts were all at once before us, we should readily trace the following points of resemblance—that the upper petal or standard differed in shape from all the rest, that the two lateral petals were pairs, and that the lowest adhered or approximated to each other, either by their lower front, or upper edges. The third point of general similitude with each other, is furnished by the stamens, which are united by their filaments into a bundle, with one solitary stamen separated from his brethren; as is represented in fig. *a b* of the preceding sketches. At other times, even this solitary stamen is united to, and forms one with the others. Examples of this union may be readily met with in the broom or in the furze. The 17th class of the Linnæan system was founded upon the assumption that the stamens were always collected into two bundles, and from thence called *diadelphia*, or a twin-brotherhood. As this in many instances is not the case, but the stamens present themselves in a solitary brotherhood, this term is inappropriate. In saying this, we must confess that it is not always possible to find terms that will in all cases suit the ever-varying habitudes and relations of nature. A pod, as we have defined it, a papilionaceous blossom, and stamens united by their filaments into one or two bundles or sets, do by their joint and common presence, afford the three essential characteristics of this order.

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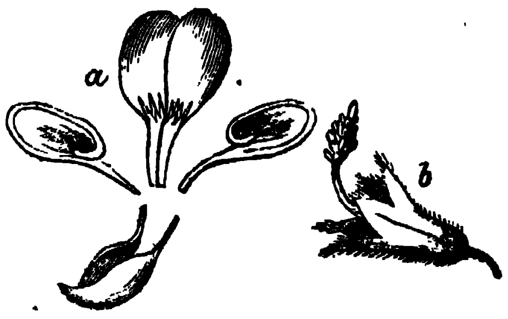
* The total circulation of books and tracts by the society since its commencement, amounts to one hundred and ninety-seven millions. During the twelvemonths ending March 31, 1835, more than sixteen millions of publications issued from the depository, and the total of receipts amounted to £56 000.



We ought not to take leave of a blossom belonging to an order of plants, which are so evidently intended to contribute to the sustenance of man, without remarking that the Divine goodness has not stopped at utility; but has bestowed marks of great beauty and interest upon those blossoms, which flourish to-day and fall to-morrow. We see that God has not only provided for the support, but also for the delight and entertainment of his creatures.

We shall conclude this brief outline of technical distinctions, by calling the attention of the reader to the particular structure of the seed. If he takes a fresh bean, and removes its covering, he will find that the substance of the seed is separable into two halves, which are called the seed-lobes. These seed-lobes he will find connected together by a small point like the tongue of a buckle, which is the embryo. In germinating, the seed-lobes often arise above the ground, and present the first pair of leaves, which are different from the rest. Examples will be given in a subsequent number.

## ALFRED THE GREAT.

Next to the cultivation of his own mind, Alfred esteemed the diffusion of knowledge among his people. He did not seek to enlighten any class exclusively, but all his subjects; and, in proof of this, we find in a circular letter addressed by Alfred to the bishops, that he earnestly recommended the translation of "useful books into the language which we all understand; so that all the youth of England, but more especially those who are of gentle kind, and at ease in their circumstances, may be grounded in letters,—for they cannot profit in any pursuit until they are well able to read English." Yet all this attachment to literature grew up in a general state of the grossest ignorance. "When I took the kingdom," says Alfred, "very few on this side of the Humber, very few beyond, not one that I could recollect south of the Thames, could understand their prayers in English, or could translate a line from Latin into English." To remedy this evil, Alfred assembled such scholars as the time afforded. Envying their knowledge of Latin, he acquired that language in his thirty-eighth year, sufficiently to translate the only book of Saxon history then extant: he translated other works of great learning, and attempted a complete version of the Bible, the finishing of which was prevented by his early death. He enforced education by refusing to promote the uneducated, as well as by his own example. He insisted that his "ministers," or the persons whom he employed, should endeavour to obtain due knowledge: and, in case of non-compliance, he deprived them of the offices which they held. Aldermen, and mayors, and governors, were forced to go to school, to them a grievous penance, rather than give up their emoluments and their command. Those who were too old to learn, or so utterly unfit for letters as to render their case hopeless, were allowed to find substitutes; a son, or a near kinsman, or failing both, a vassal, or even a slave, who was to learn in the place of his principal: and, at an advanced period of his reign, Alfred, who was called by his biographer, "the truth-teller," thanked God that those who sat in the chair of the instructor were then capable of teaching. He usually divided his time into three equal portions: one was employed in sleep and recruiting his body by diet and exercise; another in the despatch of business; a third in study and devotion; and, that he might more exactly measure the hours, he made use of burning tapers of equal length; for at the time when he lived, clocks and watches were totally unknown. And, by such a regular distribution of his time, though he suffered much from illness, this heroic prince, who fought in person fifty-six battles by sea and land, was able, during a life of no extraordinary length, to acquire more knowledge, and even to compose more books, than many studious men, who have made literature the object of their uninterrupted industry.

The impulse given to education by Alfred did not die with him. Translations of parts of the Bible were multiplied in consequence of Alfred's assiduity; and, Mr. Palgrave informs us that, from this or the Anglo-Saxon age, down to that of Wickliffe, or for nearly five centuries, we, in England, can show such a succession of versions of the Bible, in metre and in prose, as are not to be equalled amongst any other nation in Europe.

The rarity of books in Alfred's time ought to be mentioned among his obstacles; for he is believed to have given a very large estate for a book on a learned subject; a bargain which well accords with the maxim: "Learning is better than house and land."

His children, six in number, were taught the Anglo-Saxon psalms, prose, and poetry. Ethelweard, his youngest son, received a sort of public education: he was committed to proper teachers, with almost all the noble children of the province, and with many of inferior ranks. They were all assiduously instructed in Latin, in Saxon, and writing: and when they were old and strong enough, in hunting and gymnastics, as conducive to warlike habits. Alfred likewise founded and endowed schools, so as to perpetuate the benefits of his reign in future ages. Among these the chief were at Oxford; and it has been stated, though not proved, that he founded the University there. It is, however, more certain that the schools at Oxford decayed after Alfred's reign, and that city was burnt by the Danes in 979, and again in 1009; but sacred studies were restored, and the University re-established by a learned Englishman in the year 1133.

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### THE END OF CHRIST'S SUFFERING.

In reference to man, the ends of our Lord's suffering were principally these:—

1. To absolve and deliver him from guilt, the consequence of sin; and misery, the fruit of guilt: "In whom we have redemption through his blood, the forgiveness of sins," Eph. i. 7. And surely, had the fruit of Christ's death rested here, it had been a great degree of mercy, if we rightly weighed the heaviness of the burden of guilt, the severity of the wrath of God, and the extremity of that misery that doth and must attend it. If a man under the guilt and horror of some hideous treason, under the severe and inexorable sentence of the laws against him, under the imminent infliction of most exquisite and continuing torments, should but hear of a pardon and discharge from this, how welcome would it be, though the residue of his life were to be spent in exile! But our Lord's purchase rests not here.

2. To reconcile God to his creature. So that it doth not only remove the effects of the anger of God, which is punishment, which may be removed, and yet the anger continue; nor doth it only remove the anger of God, and leave a man in a kind of state of indifferency, as it is between persons that never were acquainted one with another: but it is a state of reconciliation: "That he might reconcile both unto God in one body by the cross, having slain the enmity thereby," Eph. ii. 16; "God was in Christ reconciling the world unto himself, not imputing their trespasses unto them," 2 Cor. v. 19. And, certainly, this is a great addition unto the former, that God in Christ should not only pass by our sins, but should no longer look upon us as strangers, but as persons reconciled unto him. And surely a soul sensible of the unhappy condition of being estranged from God, would highly prize a state of reconciliation, though it were in the meanest and lowest relation. "I am not worthy to be called thy son: make me as one of thy hired servants," Luke xv. 19. So that I may not be estranged from thee, reconcile me unto thyself, though in the condition of thy meanest servant. But neither doth the happy fruit of our Lord's sufferings rest here.

3. To bring us unto that near and blessed relation of being the sons of God; "that we might receive the adoption of sons," Gal. iv. 5; "Behold, now are we the sons of God, and it doth not yet appear what we shall be," 1 John iii. 2.—*Sir M. Hale.*

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## INSECTS.—No. XXXIX.

### HEARING.

(Continued from page 216.)

THAT purely rural, little noticed, and, indeed, local occurrence, says Mr. Knapp, called by the country people "hummings in the air," is annually heard in one or two fields near my dwelling. About the middle of the day, perhaps from twelve o'clock till two, on a few calm, sultry days in July, we occasionally hear, when in particular places, the humming of apparently a large swarm of bees. It is generally in some spacious, open spot, that this murmuring first arrests our attention. As we move onward, the sound becomes fainter, and by degrees is no longer audible. That this sound proceeds from a collection of bees, or some such insects, high in the air, there can be no doubt; yet the musicians are invisible. At these times, a solitary insect or so may be observed here and there, occupied in its usual employ, but this straggler takes no part in our aerial orchestra.

One of the most puzzling sounds to the inquirer is that of the death's-head moth, (*acherontia atropos,*) when it is caught and kept a prisoner. Sometimes it is like that of a mouse, but much more piteous. Reaumur, after mentioning many experiments, concludes with the conviction that "in the more minute parts of nature's works, there is always something which we cannot explain." He thought it most probable that the cry came from the head, perhaps from the mouth, or rather from the tongue, and it might be by the friction of the palpi against the tongue; for when he unfolded the spiral tongue with a pin, the cry ceased, but was renewed the instant it was coiled up again between the palpi. He then prevented the palpi from touching the tongue, which also stopped the sound, and when only one was permitted to touch it, the sound was much more feeble.

With hearing, the antennæ has, most probably, much to do. It has been used as an argument, says Kirby, that the antennæ are primarily tactors or instruments of touch, that a certain four-winged parasite fly, (*fœnus jaculator,*) before it inserts its ovipositor, plunges its antennæ into the hole forming the nidus of the bee, to the grub of which it commits its egg. But had those who used this argument, measured the antennæ and the ovipositor of this ichneumon, they would have discovered that the latter is thrice the length of the former; and as these insects generally insert it, so that even part of the abdomen enters the hole, it is clear that the antennæ cannot touch the larva; its object, therefore, cannot be to explore by that sense. Others suppose, that by these organs it scents out the destined nidus for its eggs, but Lehmann has satisfactorily proved that they are not olfactory organs. We can therefore only suppose, either that, by means of its antennæ, it hears a slight noise, produced by the latent grub, perhaps by the action of its mandibles, or else that, by its motions, it generates a motion in the atmosphere of its habitation, which, striking upon the antennæ of the fœnus, are by them communicated to its sensory. A similar disproportion is observable between the antennæ and the ovipositor of another parasite fly (*pimpla manifestator.*) Bees, when collecting honey and pollen, first insert the organs in question into the flowers which they visit; but, as I have more than once observed, they merely insert the tip of them. If anthers are bursting, or nectar is exuding, these processes, probably, are attended by a slight noise or motion of the air within the blossom, which, as in the last case, affects, without immediate contact, the exploring organs. "It is also probable, that this insertion is to ascertain the presence of, or absence of insect enemies, which may be lying in wait for mischief in the flowers."

Among the first who advanced the opinion that the antennæ are the organs of hearing, was Bonsdorf; his statements have been followed up and extended by others. One naturalist affirms, that insects erect their antennæ as other animals do their ears. And Kirby says: "I think it must be admitted, that the primary and most universal function of the antennæ, is to be the organs of a sense, if not the same, at least analogous to hearing, and answering the same end; something perhaps between it and touch. In some, however, as has been found in the crustacea, an organ of hearing, in the ordinary sense, may exist at the base of the antennæ, which may act the part, in some measure, of the external ear, and collect and transmit the sound to such organ."

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### SUPPORT UNDER TRIALS.

Were we persuaded, on conversing with a person, that we should see him no more, that he would soon exchange time for eternity, and that we should never more have the advantage of his counsels and his prayers, how attentively should we listen to his dying language, and how eager should we be to catch the last accents which fell from his quivering lips. Such were probably the feelings of the children of Israel, when Moses pronounced upon them the blessings contained in Deut. xxxiii. Amongst the most interesting of these, is the blessing of Asher, "As thy days, so shall thy strength be." The day is often put in scripture for the events of the day, and thus it is a promise that God would graciously support them under whatever trials and troubles they might be called to endure. And his promise is sure to the very end of time. Have his people work appointed for them? Are they discouraged by the greatness of their work? Yet let them remember, all their "sufficiency is of God." Are they in trouble of mind? let them cast their burden on the Lord, and He will sustain them. Are they afflicted in body? underneath them shall be the everlasting arms of Jehovah's mercy, and he will make all their bed in their sickness. Are they tempted? let them consider that there hath no temptation taken them but such as is common to men; that God is faithful, who will not suffer them to be tempted above that they are able, but will with the temptation also make a way to escape, that they may be able to bear it. Thus are they enabled to exclaim with an inspired apostle, "In all these things we are more than conquerors through Him that loved us." C. J M.

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### MUSIC.

I am persuaded that music is designed to prepare for heaven, to educate for the choral enjoyment of Paradise, to form the mind to virtue and devotion, and to charm away evil and sanctify the heart to God. A christian musician is one who has a harp in his affections, which he daily tunes to the notes of the angelic host, and with which he makes melody in his heart to the Lord. Does he strike the chord with his hands? it is to bid lute and harp awake to the glory of God. The hand, the tongue, and the ear form a kind of triple chord not to be broken. Bring music, my beloved F—, to this test, and your vocal hours will not be spent in vain. The instruction of your childhood will supply you through life with a fountain of pleasures, drawn from the true source of legitimate recreation. Sing the songs of Zion, and amidst the vibrations of the air, may true prayer and praise ascend to heaven, and enter into the ears of the Lord God of our salvation; and then will the harmonious combination be complete.—*Legh Richmond.*

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### THE SPANISH INQUISITION.

The Spanish Inquisition was established by Ferdinand and Isabella; and from 1481 to 1788 it is calculated to have condemned to punishment 343,522 persons. Of this number 34,382 were sentenced to the flames, 17,690 were burnt in effigy, and 291,450 were imprisoned, and their property confiscated. During the forty-six years of the reign of Philip v. alone, 14,086 persons were condemned to punishment; of whom 1574 suffered by fire!

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# THE
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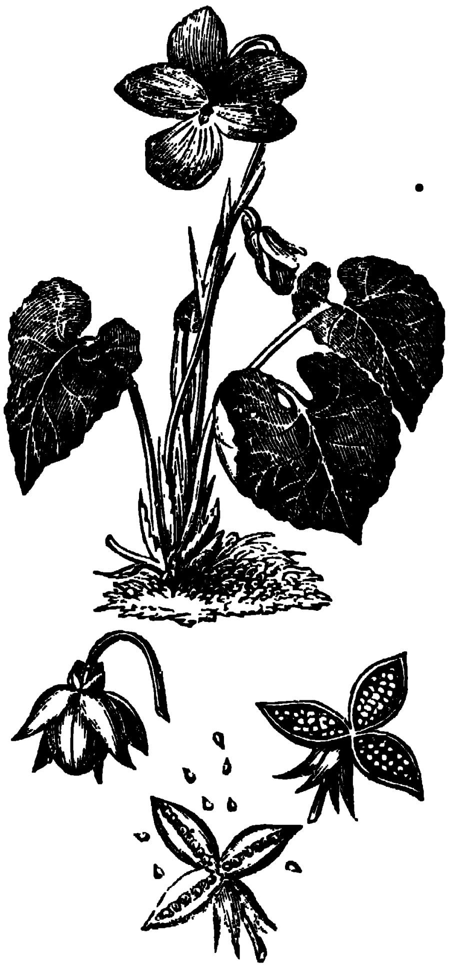
NUMBER CXLIX.] TUESDAY, JUNE 23, 1835. { PRICE ONE HALFPENNY.



VIOLETS, (VIOLA ODORATA.)

*a*, the Seed-vessel hanging downwards by its bent stalk, and covered by a large five-leaved calyx;
*b*, the same turned upwards by the straightening of the stalk, and split into three expanding shelves.
*c*, the same ejecting its seed.

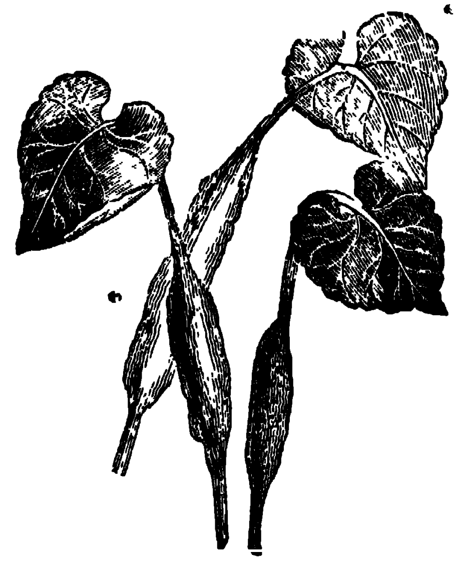
THE admired but lowly violet, which,

> Just to say the spring has come,
> Peeps sweetly from her woodland home,
> And hermit-like, from storms and wind,
> Seeks the best shelter she can find,
> 'Neath long grass banks—CLARE—

may, to a morose observer of the works of creation, appear to be of small utility in the scheme of things. The naturalist, however, who observes with sufficient minuteness the various circumstances and relations connected with any plant, and watching these through the course of the seasons, may, in most instances, discover beautiful contrivances of Providential wisdom. We shall point the attention of the reader to one or two of these, which we have remarked in violets.

During summer, the caterpillars of several of our prettiest British butterflies feed wholly upon several species of violets; among which we may mention the princess, (*Argynnis Lathonia*, Leach,) a splendid butterfly; the prince, (*Melitæa Euphrasyne*, Leach;) and most of the fritillaries. Now it may be said, scoffingly, that the caterpillars of these butterflies are only destructive vermin; and so, in one point of view, are all caterpillars: but these vermin are evidently created both to check the too extensive spread of any particular plant, (such as in this case, the violet,) that might otherwise overgrow and destroy other plants, and also to afford nourishment to numerous sorts of birds. These positions appear to us too obvious not to be assented to by every observer.

During winter, we have remarked a similar circumstance in the sweet violet, (*viola odorata*,) and illustrative, besides, of a beautiful contrivance for the protection of the insect that feeds on the plant from cold and from external enemies and injuries. The insect alluded to, which feeds on the sweet violet in winter, is the grub of a gall-fly, (*cynips?*) similar to the bedeguar insect of the rose, and the insect which produces the oak-galls, so valuable in commerce. The fly, some time in the summer or autumn, lays its eggs on or in a growing shoot of the violet; and when these are hatched, the grubs eat their way into the soft parts of the plant, which having its juices thus interrupted, bulges out into an irregular swelling around the grubs. Here they live, secure of plenty to eat, during the coldest weather; and when the summer returns, bore their way out on acquiring the adult state of flies.



(Galls upon the leaf-stalk of the Violet.)

There are found similar winter retreats of caterpillars and grubs in many other plants, and often contrived in a very different manner. In the mean time, we shall advert to a beautiful contrivance for spreading the seeds of violets, or, as we may term it, a natural sowing.

The floating of the seeds of the dandelion, and various other mechanical contrivances, by which Providence has enabled plants to diffuse their seeds, are well known to the most indifferent observers. The seeds of the violet are contained in a capsule or seed-vessel of three valves, to the inner part of which the seeds are attached, and remain so for some time after the valves, in the process of ripening, have separated and stood open. By and by, by the evaporation of their moisture, the sides of each valve shrink and roll up, and in this state their sharp edges press upon the seeds, and thereby reduce their previously irregular appearance into a straight line. Each seed is not only extremely smooth, polished, and shining, but regularly oblong; and hence, when the sharp infolding edge of the valve presses upon the slope of the seed, and continues to slide down, till it comes quite behind it, the seed is by this pressure thrown out with a jerk to some distance, according to its elevation above the soil.

We must not omit to notice another part of the contrivance of Providence, both in furthering the process of ripening, and in producing a wider diffusion of the seeds. Previous to the seed becoming ripe, the capsule hangs in a drooping position, with the cup (*calyx*) spread over it like an umbrella, to guard it from rains and dews, which would retard the process of ripening; but no sooner is the ripening completed, than the capsule becomes upright, with the cup for its support. This upright position of the cup seems intended, by Providence, to give more effect to the spring mechanism of the valves, for scattering the seeds; for it by this means gives a higher elevation, in some cases more than one inch, from which to project them.

The sweet violet is also diffused extensively by its runners, which throw out roots somewhat like those of the strawberry.

J. R.

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### AN EPICURE.

The apostle Paul thus describes some men in his day: "Whose end is destruction, whose god is their belly, and whose glory is in their shame, who mind earthly things," Phil. iii. 19.

The following anecdote relates to a similar character in the last century. A gentleman of Gloucestershire had one son, whom he sent abroad to make the grand tour of the continent; upon which journey, the young man attended to nothing but the various modes of cooking, and methods of eating and drinking luxuriously. Before his return, his father died, leaving him a very large monied fortune, and a small landed estate. He now looked over his note-book, to discover where the most exquisite dishes were to be had, and the best cooks procured. He had no other servants in his house than men cooks; his butler, footman, housekeeper, coachman, and grooms, were all cooks. He had three Italian cooks; one from Florence, another from Sienna, and a third from Viterbo, for dressing one Florentine dish. He had a messenger constantly on the road between Brittany and London, to bring him the eggs of a certain sort of plover found in the former place. He was known to eat a single dinner at the expense of fifty-eight pounds, though himself only sat down to it, and there were but two dishes. In nine years he found himself getting poor, and this made him melancholy and ill. When totally ruined, having spent nearly one hundred and fifty thousand pounds, a friend gave him a guinea to keep him from starving; and he was found in a garret soon afterwards, roasting an ortolan (an expensive bird) with his own hands. A few days afterwards this infatuated person shot himself; and thus rushed unbidden into the presence of Him whose bounties he had so wickedly wasted and perverted.

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## CHEMISTRY.—No. XII.

### METALS, NO. 2—LEAD, MERCURY, ZINC, PLATINUM, &C.

Lead has a bluish-white colour, and a very brilliant surface when cut with a knife, though this is soon lost by exposure to the air. Lead is the softest of all metals, melts at 612° Fahrenheit, and has a specific gravity of nearly 11½. The lead used in this country is chiefly procured from Scotland and the north of England, and is found combined with sulphur, forming a sulphuret of lead, sometimes called galena. It will unite with oxygen, and there are three oxides, the yellow, the red, and the brown, which are useful in dyeing, calico-printing, and in the manufacture of glass. This metal unites with the acids, and forms many salts of lead; and by its mixture with other metals, several useful alloys are produced.

Mercury, or quicksilver, is easily distinguished by its retaining a fluid state at common temperatures. It is a white, brilliant, and heavy metal, having a specific gravity of 13½. This metal is found in Spain, and in South America. It may be made to take a solid form when reduced to a temperature of 39° below the freezing point. By long exposure to the air it oxidizes, and its surface will be covered over with a fine black powder. Its alloys are called by chemists, amalgams; but it is not very evident why they should be thus distinguished. Mercury is used to separate the precious metals from their ores, for covering the backs of looking-glass, for the manufacture of vermilion, and in many philosophical experiments. It is also used in medicine; for it forms many useful salts, the most important of which is calomel.

Zinc is not a very malleable or ductile metal; its specific gravity is nearly 7; it melts at 680° Fahrenheit, and is so combustible, that if beaten into thin leaves, it will take fire from the flame of a common taper. When zinc is broken into pieces, it has a shining blueish-white colour; but after it has been exposed to the air for a short time, it is covered with a pellicle or thin film, that has a beautifully varied appearance. Its two principal ores are calamine and blende. Several useful alloys are produced by the combination of this metal with copper, and it is the base of several salts.

Platinum is 21½ times heavier than water, and is the heaviest of the metals. It is chiefly obtained in South America, where it is found in small white grains. From its scarcity, and consequent high price, it has not been extensively used, though it possesses many properties that would render it very serviceable in the manufactures. It is nearly as hard as the purest iron, is not very malleable, but is so ductile, that it may be drawn out into a wire having a diameter of not more than 1-18000th part of an inch. It cannot be melted in any furnace, but is capable of welding, a property which almost compensates for its want of fusibility. It is not tarnished by either the air, heat, or moisture.

The remaining metals are not found in so great abundance, and are not so useful to man as those we have described; we shall therefore very briefly refer to those that have been employed for useful purposes, and simply mention the names of the others.

Nickel is a white metal that may be fused, though with difficulty. It is used in China for the manufacture of white copper. Cobalt has a light-grey colour, and is brittle. It is employed in painting and enamels. Manganese is brittle and hard, has a greyish colour, and is used in bleaching, in purifying glass, and in glazing black earthenware. Bismuth is very fusible, and imparts the same property to other metals when they are combined with it. It is used in the manufacture of printer's types. Antimony is used for the same purpose; it is a brittle metal, has a bright white colour, and is not ductile. Its oxides are used as medicines. Arsenic is a greyish-white metal, and forms, by combination with oxygen, the deadly poison known by the same name.

It has been already stated, that Sir Humphrey Davy undertook a thorough examination, by means of a powerful voltaic battery, of the earths and alkalies, to determine whether they were simple or compound bodies. His labour resulted in the decomposition of nearly all the earths and fixed alkalies; and the remaining earths have been since decomposed. The following are the bases of the earths:—aluminum is the base of alumina; zirconium of zirconia; glucinum of glucina; yttrium of yttria; calcium of lime; barium of barytes; strontium of strontites. Silicon has been already mentioned as the base of silica; but it is not a metallic substance. The base of potash is called potassium, a white metal that melts at 150° of Fahrenheit, and is distinguished for its extraordinary affinity for oxygen. If a piece of potassium be thrown upon a vessel of water, it will combine with a portion of oxygen and inflame. Sodium, the base of soda, the other fixed alkali, possesses properties very similar to those of potassium, though it has not so great an affinity for oxygen. Lithium is the base of the newly-discovered earth called lithia. Chromium is employed in painting glass and porcelain, but is too expensive to be much used. The other metals are thorium, cerium, uranium, molybdenum, titanium, tungsten, columbium, sometimes called tantalum, tellurium, cadmium, vanadium, palladium, rhodium, iridium, and osmium.

## THE PLAINNESS OF THE CHRISTIAN RELIGION.

The christian religion, according to my creed, is a very simple thing, intelligible to the meanest capacity; and what, if we are at pains to join practice to knowledge, we may make ourselves acquainted with, without turning over many books. It is the distinguished excellence of this religion that it is entirely popular, and fitted, both in its doctrines and its evidences, to all conditions and capacities of reasonable creatures; a character which does not belong to any other religious or philosophical system that ever appeared in the world. I wonder to see so many men, eminent for both their piety and their capacity, labouring to make a mystery of this Divine institution. If God vouchsafe to reveal himself to mankind, can we suppose that he chooses to do it in such a manner that none but the learned and contemplative can understand him? The generality of mankind can never, in any possible circumstances, have leisure or capacity for learning or profound contemplation. If, therefore, we make christianity a mystery, we exclude the greater part of mankind from the knowledge of it, which is directly contrary to the will of its Author, as is plain from his explicit and reiterated declarations. In a word, I am perfectly convinced that an intimate acquaintance with the scripture, particularly the Gospels, is all that is necessary to our accomplishment in true christian knowledge. I have looked into some systems of theology, but I never read one of them to an end, because I found I could never reap any instruction from them. To darken what is clear, by wrapping it up in a veil of system and science, was all the purpose that the best of them seems to me to answer.—*Beattie's Evidences of the Christian Religion.*

## VISIT TO THE BOSTON INSTITUTION FOR THE BLIND.

In the room into which we first entered, there was a sort of railing, connecting two adjoining sides and enclosing a corner, and nearly one-third of the room. Within this, sat a man upon a bundle of willow twigs, making willow baskets. We looked at this man at work a little time, and then ascended a flight of stairs, which were in the corner of the room, to the chamber above. We had before, when we first entered the yard, heard music, and on going into this chamber, we saw three blind men playing on a piano, bass-viol, and violin; they were also singing, and each one seemed to engage in it with his whole soul, and I had almost said body, for there was a great deal of action. A group of visitors stood about them, with smiling countenances, pleased with witnessing the pleasure that the blind seemed to feel.

After looking at the group a few minutes, I cast my eyes about the room, to see what was there. It was a sort of double room, like parlours, united by sliding-doors; the doors, however, were wanting, and nothing separated the two parts of the room but the parts of the partition to which the doors are usually attached. The piano was on one side, between two windows; a number of persons were gathered around this, while many others were walking about, visiting pupils in different parts of the room.

On the side opposite me, I saw a row of desks, and behind them two boys; they were seated, and had screens over their eyes, and were apparently engaged in doing something on their desk cover. I went to see them. They had on the desk a small square board, of the size of a checker-board; it was perforated with holes about a quarter of an inch square, and half an inch deep; they had also types an inch long, and just large enough to slip into these holes.' These boys were cyphering, and the types were figures. Instead of writing the sums upon a slate, they felt the figures on the types, which were large, and placed one after another in its hole, in their proper order, until the whole number was down. By passing the fingers over it, they could easily tell what the figures were, and, of course, what the number was. A larger boy was standing near them: I asked him if he would give them a sum to do?

"Oh, yes," he said, taking all the types out of their holes, but two short rows; "Here, George, won't you do a sum in substraction, and do it aloud, so that we can hear?"

George began: he put his finger on the top line, and moved it along till he came to the first figure on the right; he felt for that, a moment; "eight;" then, feeling for the type immediately under it, "four," said he; "four from eight leaves four." He then took up a type, and feeling it a moment, placed it under the others, in such a position that it stood for four. I ought to have said before, that he had but two or three different kinds of type, but that, by placing them in different positions in these square holes, they would stand for three or four different figures; thus, with three different types, he could express all the digits; and, with more types of the same kind, he could express any number he wished. After placing the figure four in its position, he felt the next figure of the upper line, and said, "seven;" then feeling the one under it, "four." He said, "four from seven, leaves three;" he then took another type, felt it an instant, and placed it in the square hole beneath, in such a manner as to signify three.

I saw two girls, about nine years of age; they were seated behind desks, and had a large, thick folio book before them. I went to them, and asked one if she could read in the book.

"Oh, yes," she said.

"What book is it?"

"It is the book of extracts from —"

I could not hear the rest, for the three blind men again poured out their souls in song.

"Will you let me hear you read?" I asked.

"Yes," she said; and immediately opening the book, began to feel the pages.

While she was finding her place, I examined the leaves; they were, of coarse thick paper; and the letters were formed by raised portions of the leaf above the surface, making, as it were, a paper ridge. The letters were thus raised above the surface, and being large, you could tell what they were by feeling them.

The girl found her place, and passing her fingers slowly over the words, read, "The—art—of—pleasing—is——' I have forgotten the rest, but she went on for several lines, reading without any difficulty.

I asked her if she liked to read.

"Yes," she said, "I like it well enough. But I had rather read in the Testament."

At the same time I heard Dr. Howe say, "If you will mention any chapter and verse, she will find it for you." I asked her to turn to the 10th chapter of John, and the 13th verse. She took the Testament from the desk where the other little girl had laid it, and put it on her own; she opened the book, and after turning the leaves backward and forward a number of times, and feeling the pages, to learn what book and what chapter it was, she began; "And—he,"—"Oh, you said the tenth chapter, and thirteenth verse—I forgot." She then turned over the leaves again, and finding the place, read.

I now took my seat near a girl of about fifteen. She was sewing, and engaged in conversation with her companion, a girl two or three years older.

"How long have you been here?" said I.

"Five months," was the reply.

"Could you work before you came here?"

"A little."

"I suppose it must be very pleasant to you here, where you can learn something every day."

"It is. I learn arithmetic, reading, and singing; and I sew."

"Have you any exercise?"

"We walk every day, and work about the house."

Another of the pupils came up laughing, and asked the elder of the two girls to thread her needle, which she did with great rapidity, by putting the needle and end of the thread in her mouth.

A lady asked her why she did this, "Cannot you feel to do it with your fingers?"

She smiled, and said, "Not nearly so quick."

They all looked cheerful and happy in their various employments, and where two or three were sitting together, were evidently quite interested in conversation. One was braiding straw very rapidly; and I noticed that she put her fingers into a small mug of water, which stood on a desk before her, without hesitating the least, or ever missing it.

One young woman gave us an account of their various occupations and studies, and particularly the instructions in singing.

"How do you take your lessons in singing?"

"The teacher describes to us what he wants us to learn. He is very particular about the sounds."

"Have you any notes, or printed rules, similar to your reading books?"

"No; we learn altogether by describing."

"Do all the pupils sing?"

"Yes, I think every one does."

"Are you all fond of music?"

"Oh, yes, we are very fond of it."

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### THE RED SEA.

The Red Sea occupies a deep, rocky cavity, extending about one thousand one hundred and sixty miles in length, and its mean breadth may be taken at about one hundred and twenty. Strabo has compared its shape to that of a broad river; and it does not receive the waters of a single tributary stream. The name greatly puzzled the ancients, and has occasioned in later times a display of much superfluous learning, to determine whether it was derived from the colour of the water, the reflection of the sand-banks, and the neighbouring mountains, or the solar rays struggling through a dense atmosphere. These various conjectures are set at rest; both the air and water are unusually clear; the theory of king Erythrus is exploded; and the name is now admitted to be merely a Greek translation of the "sea of Edom," (a Hebrew word denoting Red,) so frequently mentioned by the sacred writers. Its surface is diversified with a number of islands; some of which, such as Kotemble, and Gebel Tor, near Loheia, exhibit volcanic appearances. The western coast is bold, and has more depth of water than the eastern, where the coral rocks are gradually encroaching on their native element. These reefs are found dispersed over the whole gulf, rising, in some places, ten fathoms above the water. The bottom is covered with an abundant harvest of this substance as well as of certain plants; and, if examined in calm weather, it has the appearance of verdant meadows, and submarine forests; phenomena which procured this gulf the appellation of Yam Zuph, from the Jews, and Bai.. Souf, from the Arabs, signifying (in both languages) the "Sea of Green Weeds." These beautiful productions attracted the admiration of antiquity. Strabo seems to allude to them when he speaks of trees, resembling the laurel and the olive, growing at the bottom and along the eastern coast of the Red Sea, which at ebb-tide were left uncovered, though at other times they were wholly under water; a circumstance deemed the more surprising, when contrasted with the nakedness of the adjacent shores. Burckhardt remarks, that the coral in the inlet of Akaba is red, and that in the gulf of Suez the white is chiefly to be seen;—facts which may reconcile the discordant statements of Bruce, Valentia, Henniker, and other modern travellers.

All who have frequented the Red Sea, have observed the luminous appearance or phosphorescence of its waters. "It was beautiful," says a graphic writer, who sailed from Mocha to Cosseir, "to look down into this brightly transparent sea, and mark the coral here in large masses of honeycomb-rock, there in light branches of a pale red hue, and the bed of green sea-weed, and the golden sand, and the shells, and the fish sporting round the vessel, and making colours of a beauty to the eye, which is not their own. Twice or thrice we ran on after dark for an hour or two; and though we were all familiar with the sparkling of the sea round the boat at night, never have I seen it in other waters so superlatively splendid. A rope dipped in it and drawn forth, came up as a string of gems; but with a life, and light, and motion, the diamond does not know."* Those sealights have been explained by a diversity of causes; but the singular brilliancy of the Red Sea seems owing to fish-spawn and animalculæ; a conjecture which receives some corroboration from the circumstance, that travellers who mention it visited the gulf during the spawning period—that is, between the latter end of December and the end of February. The coral banks are less numerous in the southern parts. It deserves notice, that Dr. Shaw and Mr. Bruce have stated, (what could be true, only so far as their own experience went,) that they observed no species of weed or flag; and the latter proposes to translate Yam Zuph, "the Sea of Coral," a name as appropriate as that of Edom.—*Andrew Crichton.*

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* Scenes and Impressions.

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### A THRUSH.

WHEN I lay in bed last summer, unable to speak or move for many hours in the day, the song of the birds furnished me with an inexhaustible source of amusing observation. I could not but feel grateful to the melodious little creatures, who beguiled me of half my pain, and made the weary hours of sickness fly away upon wings as light as their own. As if led by an instinctive sympathy, numbers of blackbirds and thrushes came to build their nests round our garden: and the wood-pigeons, which had been silent the year before, renewed their soft notes in the high trees by the parsonage lawn. However, they were shy, and I thought myself fortunate, if once or twice in the day their gentle cooing found its way to my ear. But there was one thrush, whose notes I soon learned to distinguish from all the other thrushes. Every morning I listened for his voice, which was sure to precede the matins of all the other birds. In the day-time, his brilliant tones were mingled and almost lost in the general melody; but as soon as the sun was preparing to set, when the blackbirds had either sung themselves to sleep, or were flown off to keep their festivals elsewhere, then was my thrush's practising time. He was kind enough to select a tree not far from my window, while the other thrushes placed themselves at a respectful distance, and edged in a note here and there as they could. He opened the rehearsal with a number of wild trills and calls, which I could not well understand, only they were very sweet and cheering to me; and he would pause between each, till a soft response was heard from some distant bough. But when he had fixed upon a little cadence which pleased him, it became a more serious business. Strange to say, I could always tell when this would be; for what pleased me particularly, was sure to please him: so true is it that nature has given the same perception of melody to man and birds. He would chant it over in a low tone two or three times, as if to make himself sure of it; then he carolled it out with triumphant glee; then stopped short on a sudden, as much as to say to his rivals, "Which of you can imitate my strains?" Their notes sounded most sweet at various distances during these little intervals; but they seemed conscious of their inferiority to my favourite, who would suddenly break out into the same melody, upon which he had doubtless been musing all the while, enriching it by some little note or trill, the wildest and most touching that ever came into a thrush's heart. I needed neither concert nor music-master, while I could listen to the untaught, but not unpremeditated harmony of this original professor: nor could I quarrel with the sickness, which had been the means of developing another link in that mysterious chain, which binds me to the rest of creation, by opening my ear and my heart more than ever to the language of universal nature.—*Miss Graham.*

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### THE UPRIGHT.

THE psalmist says, "The upright shall have dominion," Psa. xlix. 14.

What this passage before us affirms, is concerning real christians. They are first, judicially upright. Faith in a Saviour evidences them to be interested in his merits, and those impart perfect uprightness to the soul. The law of God, however penetrating, sees no stain on the mind over which the covering of a Saviour's worthiness has been spread. All the deficiencies of christians before their great and almighty Creditor, are supplied out of the ample gospel treasury. The Saviour is an Advocate who cancels every indictment which men or devils bring to the bar of heaven against those who confide in him, and commit their cause to his management. He descended from heaven to be the Advocate of men; he has wrought out and brought in an everlasting righteousness, that it might be affirmed of him, he justifieth the ungodly. Let not then Sinai affright you, real christians, "you are not under the law, but under grace." The law is a prostrated enemy, or rather, the eternal guardian of your happiness, and an argument of your everlasting peace. It admits that you have performed all your duties; are deficient before none of its requirements; have injured none of its statutes; not incurred the guilt of one offence; not of meditating the smallest transgression; that Adam in paradise, or seraphs in glory, are equally entitled as you are to the slightest censure; it pronounces your complete acquittal from crimes, and acknowledges the validity of your merit as titles to high rewards; it designates you as perfectly upright, considered as believers in a great Representative. Such is the condition of believers in Christ; but there is not a privilege which is shared with others. Human merit is very different to the righteousness of Christ. Wretched men, who have no greater riches than personal worthiness, know that it is in a state of insolvency that you meet the great Creditor, who will support all his demands. Will not the pillow you lie on, where God was seldom or never remembered; the walls which enclosed your retirements, but which seldom witnessed a knee bended before the Lord; the earth over which you have trod in pursuit of sinful pleasures; and the heavens, whose light you have abused; will not the Bible which you have read so little; the relationships of life, in all the duties of which there has been a deficiency; time, so much of which has been misspent: will not these witnesses all appear against you in the court of heaven? And when you refuse to seek an advocate in the Saviour, on what is your dependence placed? To those inquiring the way into heaven's sanctuary, let it be said, it is by faith we enter; "He that cometh to God must believe that He is, and that He is a rewarder of them that diligently seek Him."—*Watson.*

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## QUEEN ELIZABETH.

Of the education of Elizabeth, we have a gratifying report. Ascham, her master, was proud of being preceptor to the greatest pupil in England. Through his instruction, she became familiar, in her sixteenth year, with Greek and Latin. She, like her royal predecessor, king Alfred, completed an English translation from the Greek of Boethius's "Consolations of Philosophy."

The original copy of queen Elizabeth's translation of Boethius, partly in her majesty's hand-writing, and partly in that of her secretary, was discovered about five years since in the state-paper office.

The reader of history will recollect that Elizabeth was for some time imprisoned by her sister, queen Mary, at Woodstock. A New Testament is still preserved, which bears the initials of the captive princess, in her own beautiful hand-writing. She wrote the following words on it, with a mixed allusion to her religious consolations and solitary life: "I walk many times into the pleasant fields of holy scriptures, where I pluck up goodly sentences by pruning, eat them by reading, chew them by musing, and lay them up at length in the high seat of memory; that having tasted their sweetness, I may the less perceive the bitterness of this miserable life." She is likewise said to have written some affecting verses with charcoal on a shutter of her chamber at Woodstock. In short, Ascham mentions Elizabeth, as at the head of the lettered ladies in England, excelling even Jane Grey, and Margaret Roper; the latter a daughter of Sir Thomas More.

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## A REPROOF.

The late Rev. Richard Watson would sometimes step out of his way, to administer merited reproof.

One sabbath morning, in Wakefield, he had not proceeded far in his discourse, when he observed an individual in a pew just before him rise from his seat, and turn round to look at the clock in the front of the gallery, as if the service were a weariness to him. The unseemly act called forth the following rebuke: "A remarkable change," said the speaker, "has taken place among the people of this country in regard to the public service of religion. Our forefathers put their clocks on the outside of their places of worship, that they might not be too late in their attendance. We have transferred them to the inside of the house of God, lest we should stay too long in the service. A sad and an ominous change!"—*Jackson's Memoirs of Watson.*

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# THE WEEKLY VISITOR.

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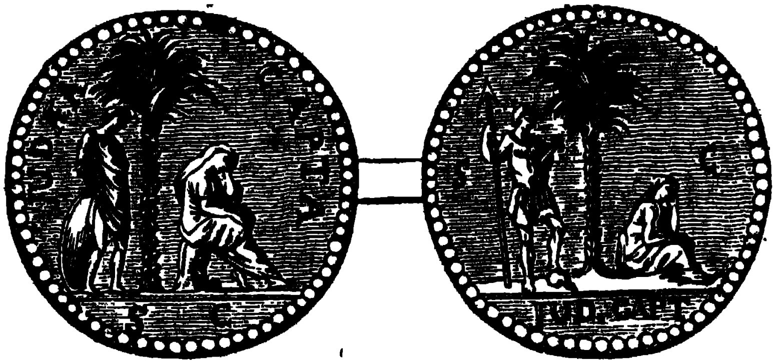
WOMEN MOURNING IN THE EAST.

### EASTERN MOURNING.

RAE WILSON when leaving Bethlehem observes: When departing from the convent, my attention was attracted by a crowd of women, ranged in a circle, who seemed overpowered with grief and despair, and were making an extraordinary howling or inarticulate noise. On approaching them, I found they were sitting around a recently dug grave, lamenting the loss of a native of the village, whose body was laid in it.

Many of these females hung down their heads upon their breasts; others were wringing their hands, and wept bitterly, looking, at the same time, into the grave; several were actually howling aloud, in a peculiar tremulous tone, as if suffering acute bodily pain, and in reality appearing to feel a deep sorrow for the loss sustained: this is called by the Arabs, *Errawa*. On the other hand, I could evidently perceive that many of the group were merely acting a part; in other words, skilfully assuming the appearance of sorrow they were paid for exhibiting. The Scriptures seems to warrant the conclusion, that the posture of these women, sitting on the ground, and going through a scene expressive of grief, is a very ancient custom, Judges xi. 40, Jer. ix. 17, 18, 2 Chron. xxxv. 25, Amos v. 16, 1 Kings xiii. 30, since we find this exhibition corresponds with that made by the children of Israel after the destruction of Jerusalem, Lam. ii. 10. The Jews lamented their dispersion in a similar posture, Psalm cxxxvii. 1. In reference to these, one of the prophets alludes to the desolation of Judea, on account of sin, Isaiah iii. 26. And, it may be added as a very striking fact, that Judea is symbolically represented on Roman medals by the figure of a female, in a sitting posture, at the foot of a palm-tree, with her head bent, as if she were letting fall her tears upon the ground.



The legend inscribed on these medals is, "JUDÆA CAPTA." The lamentation of Rachel in the village of Rama, adjacent to Bethlehem, as described by the prophet and the evangelist, illustrates this subject, Jer. ix. 1, Matt. ii. 18. Had not such lamentations over the dead been the practice in the east at the time, those who came to the house of Lazarus, to administer consolation to his sisters, would not have formed the idea that Mary had departed from it to repair to his tomb, in order to mourn over it, John xi. 31, 35. Our Lord himself wept over the tomb of Lazarus. Further, we find that women mourned for Josiah. Lamentations was also made for Stephen at his burial, Acts viii. 2; and many other instances of a similar description might be mentioned. It appears, indeed, from one of the sacred historians, that when any one met a funeral procession, it was expected that he should mingle his tears and mournful songs with those who bewailed, Luke vii. 32.

In some parts of our own country, it frequently happens that persons are employed to play on doleful instruments, and walk in procession to the grave, those who meet them joining the company of mourners. I may also remark, that at the present day, similar public exhibitions of grief on occasion of the extinction of life are observed in Greece. This is expressed by loud cries, and extolling the virtues of the deceased. If it be a female, or an unmarried person of the male sex, the funeral train consists of women, who utter piercing shrieks as they go along. At this time I did not learn the definite period to which such lamentations extended, though we find that, in general, there was anciently no fixed interval for them. At the same time, the scriptures state, that for the death of a father this was to be seven, Gen. l. 3, 10, Job ii. 13, and sometimes even so long as seventy days, and for a wife the former. The children of Israel wept for Moses thirty, Deut. xxxiv. 8; the Egyptians, for Joseph seventy days, and Josiah was mourned for, 2 Chron. xxxv. 25. Lastly, a prophet mourned a certain number of days, on account of the conflagration and destruction of Jerusalem, and captivity of the Jews, Neh. i. 2—4.

In consequence of part of the earth being thrown over the body, I did not see if there was a coffin or not; and this leads to a remark, that many persons of the lower orders in Judea are interred in their *symarer*, or shroud, without a coffin. Of old, the body was placed uncovered on a bier, which might have a resemblance to a coffin, or bed, in order to be conveyed for burial. For instance, on one of these was carried forth the widow's son of Nain, whom our compassionate Lord restored to life. It was the same in the case of Ananias, Acts v. 6, 2 Chron. xvi. 14; and the body of Christ himself was in this manner committed to the tomb, John xix. 40.

## CHRISTIANITY AND MOHAMMEDANISM CONTRASTED.

Go to your natural religion, set before her Mohammed and his disciples, arrayed in armour and in blood, riding in triumph over the spoils of thousands and tens of thousands, who fell by his victorious sword. Show her the cities which he set in flames, the countries which he ravaged and destroyed, and the miserable distress of the inhabitants of the earth. When she has viewed him in this scene, carry her into his retirements: show her the prophet's chamber, his concubines and wives; let her see his adultery, and hear him allege revelation and his divine commission to justify his lust and his oppression. When she is tired with this prospect, then show her the blessed Jesus, humble and meek, doing good to all the sons of men, patiently instructing both the ignorant and perverse. Let her see him in his most retired privacies: let her follow him to the mount, and hear his devotions and supplications to God. Carry her to his table, to view his poor fare and hear his heavenly discourse. Let her see him injured, but not provoked: let her attend him to the tribunal, and consider the patience with which he endured the scoffs and reproaches of his enemies. Lead her to his cross, and let her view him in the agony of death, and hear his last prayer for his persecutors: "Father, forgive them, for they know not what they do!" When natural religion hath viewed both, ask, "Which is the prophet of God?" But her answer we have already had; when she saw part of this scene through the eyes of the centurion who attended the cross; by him she spoke and said, "Truly this man was the Son of God."—*Bp. Sherlock.*

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## DAVID, THE CHRISTIAN SLAVE.

MR. KNIBB says:—

"A few years ago, a plantation-slave, one of the members of the baptist church at Montego Bay, was banished from his home, and sent to the estate where a slave named David lived, to be cured of his praying. By the pious conversation of this exiled christian negro, David was brought under serious concern for his soul, which ended in his conversion to God. Acting up to the christian negro's motto, that "what good for one negro, good for him brother too," David spoke to his fellow-slaves about Jesus, and his love in dying for poor sinners. God, who despiseth not the humblest instrument, blessed the efforts of this poor negro, and, in a short time, about thirty on the estate began to pray, and at length built a small hut, in which, after the labours of the day, they might assemble and worship God. Tidings of these things reached the ears of the white persons employed on the estate, and David was summoned before his attorney, and asked whether he was teaching the slaves to pray. On replying in the affirmative, the hut was demolished and burnt, and David was stretched upon the earth, and flogged with the cart-whip till his flesh was covered with his blood. Next Lord's-day I missed David at the house of God. His afflicted wife came and told me the sad tale of his sufferings, and informed me, that his hands were bound, and his feet made fast in the stocks. Often did I inquire after him, and for him, and the same answer was returned, "Massa, him in the stocks;" till one morning, as I sat in my piazza, he appeared before the window. There he stood—I have his image now before me—he was hand-cuffed, barefoot, unable to wear his clothes, from his yet unhealed back; his wife had fastened some of her garments round his lacerated body. I called him in, and said,

"'David, David, what have you done?'

"With a look of resignation I shall never forget, he replied,

"'Don't ask me, ask him that bring me, massa.'

"Turning to the negro who had him in charge, I said,

"'Well, what has this poor man done?'

"'Him pray, massa,' was the reply, 'and Buchra sending him to the workhouse for punishing.'

"I gave him some refreshment, for in the state I have described he had walked thirteen miles under a burning sun, and followed him to that den of cruelty, properly designated a Jamaica inquisition. He was chained to a fellow-slave by the neck, and sent to work on the public roads. The next day I went to visit him again, when I was informed by the supervisor of the workhouse, that he had received orders to have him flogged again as soon as his back was well enough to bear it. In these chains David remained for months; frequently I saw him, but never did I hear one murmur or one complaint, except when he heard that the partner of his joys and sorrows was ill on the estate, and he was forbidden to go and see her.

"At the end of three months he was liberated, and returning to the estate, was asked,

"'Now, sir, will you pray again?'

"'Massa,' said the persecuted disciple, 'you know me is a good slave, but if trouble come for dis, me must pray, and me must teach me broder to pray too.'

"Again he was immured in a dungeon, and his feet made fast in the stocks."—*From the Bow in the Cloud.*

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## EXAMPLES OF LEGUMINACEOUS PLANTS.

As the examples of this family are very numerous, we must content ourselves with describing such as are most commonly met with in our wastes and hedges. These, if their structure be compared by an observing eye, with the concise descriptions which will be here given, divested, as much as possible, of botanical refinements, will serve to exercise the student in the details of this most interesting study. When we speak of divesting the subject of its refinements, we must be understood as only referring to what is artificially refined in language. For to withhold any thing from the attention of our readers, which is scientific and curious, would be to them a manifest injustice, and afford us but little credit. Since the commencement of these papers, we have often cast in our minds whether it would not be possible to convey a good deal of solid science, with a far less copious use of those terms in which we have been long accustomed to express ourselves, but which have a tendency to perplex and puzzle the general reader, and thereby oppose a stumbling-block in the way of his inquiries, instead of facilitating his improvement. How far we shall succeed in the work of plainness and simplification, these papers will determine.

The first example we shall select as illustrative of leguminous plants shall be one that is well known to every eye, the *ulex Europea.* This is that thorny shrub, which we call, in plain English, furze, and sometimes whin, in allusion, it would seem, to the piercing thorns which it bears. For whin, as we infer from its use in the term *whin-yard,* a sword, or tuck, signified to pierce, or a piercing instrument. The appearance of a heath covered with furze, when, amidst the stern embraces of mid-winter, it clothes the barren waste in one continuous sheet of gayest blossoms, is said to have so struck the attention of the celebrated Linnè, that he fell upon his knees in admiration. If the mind on this occasion ascended, with feelings of awe and love, through the creature to the Creator, such an attitude was not unbecoming a zealous explorer of nature.

In the *ulex* all the ten stamens are united into a single bundle, or brotherhood. But, in addition to this circumstance, the chief characteristics are the simplicity of the calyx, and the shortness of the pod. The former is divided into only two leaves, while the latter scarcely exceeds it in length. Absolute size is liable to many variations in plants, but the comparative size will sometimes afford a ready and certain mark for distinction. For the length and diameter of one part, when compared with the length and diameter of another, is an element in a plant or shrub's proportions. There is a variety of this shrub, which some consider a distinct species. It is remarkable for having the corolla, or coloured part, so small, that when expanded it does not peer above the calyx. The stem of this variety is round, whereas in the common variety it is angular. A change in the blossom is followed or preceded by a change, we see, in the stem.

The various species of the *trifolium,* trefoil and clover, are examples of this family. In the genus trifolium, the pod is short, scarcely presenting itself beyond the calyx; but the head of these trim little flowers, the three-fold leaf, and the tender habit, when united, form a character, which is very obvious, and is, perhaps, as philosophical as any that could be drawn from considerations that require deeper research.

The *trifolium pratense,* purple trefoil, or clover, is among the most common and the most useful of plants. A copious dispersion of it among the grassy sod is considered by the farmer as the most essential ingredient in a good pasturage.

The *trifolium repens,* or Dutch clover, is not only distinguished from the foregoing by the whiteness of its flowers, but by a mark of a more certain, though, perhaps, of a less striking description, namely, its creeping stem. A creeping stem, in the language of botany, is one, which, at its joints, throws out fresh roots instead of branches. We have sometimes seen the heads of this clover in a state which is called prolific; that is, the flower-buds, instead of becoming blossoms, seem inclined to turn into little plants, and thus derive their nutriment and support from the parent, instead of drawing them from the earth.

The *trifolium arvense* is often met with in our summer walks, and its singular resemblance to a hare's-foot, whence it is called the hare's-foot trefoil, does not fail to engage our curiosity. Upon examination we find, that the calyx is clothed with a close array of soft points, which botanists, as well as anatomists, call *villi.* The shaggy appearance of the head of flowers is increased by the divisions of the calyx, which are thin, and pointed like bristles.

In the *trifolium fragiferum,* we encounter another metamorphosis of the calyx; here instead of being soft or leafy, it is expanded into a filmy or membranous ball. The head being thickly paved with these inflated cups, puts on an appearance which very much resembles a strawberry, whence it is called the strawberry trefoil.

The last we shall mention, is the *trifolium procumbens,* or hop-trefoil. The hop-trefoil has a small head of minute yellow flowers, which, instead of falling, are changed into thin parched films of a very delicate texture. The permanency of these withered, but still adhering blossoms, serves to arrest our observation, and mark out the *trifolium procumbens*, or hop-trefoil.

It has been usual to consider the melilot, *melilotus officinalis*, as pertaining to the genus trifolium; from which it is chiefly distinguished by having its flowers in a loose spike, (*raceme.*) The melilot, however, recommends itself to the eye of the passing observer, by its conspicuous yellow flowers, its erect stem, and the powerful, but pleasant odour, which it diffuses around it. It is always very much corroded by insects, to which it seems to be a very choice morsel; so that it is not easy to find a nice specimen for preservation. It is sometimes found growing by road-sides, where it presents an interesting object to one who delights to mark the beauties and singularities of nature.

The genus *medicago* seems to rank after the trifolium in a natural sequel, as possessing many points of mutual affinity, both in respect of form and quality. Of the medicago we have a common example in the *sativa*, or lucern, which has long been an object of cultivation among our farmers. But notwithstanding their outward resemblance, a nearer view discloses a difference which cannot fail to interest the student of nature. In the trifolium, the pods are plain and simple, but in the medicago they are more or less bent into a spiral form, with wrinkles, sharp points, or some kind of inequality upon the surface. When we meet, therefore, with a plant resembling trefoil, we must examine the pod; which, if we find bent into a curious form, or covered with points, we may consider that it belongs to the medicago. Some of the species most frequently met with, resemble the hop-trefoil in their little yellow head of flowers, but may always be discriminated by a reference to the form of the pod. These pods in the yellow medick, (*medicago falcata,*) are bent like a sickle, or the new moon; while in the trefoil medick, (*medicago lupilina,*) they resemble a kidney.

The *vicia sativa*, or common tare, cultivated as a common article of fodder, is a native of this country. The lover of botanical research should gather a piece of the tare in the corn-field, or snatch a flower from the loaded cart, as it passes by him to replenish the crib of the useful dependants of man. If the pistil, or central thread, be disengaged from the rest, it will be found to be smooth on the upper surface, and bearded beneath. The pod also is generally roughened by knot-like protuberances.

These marks will assist him in identifying the *vicia cracca*, or tufted vetch, a pretty plant, found in our hedges during the summer months. The flowers of this plant grow in a kind of spike, are of a purple colour, and bend one over the other, like tiles upon the roof of a house.

One of the most frequent ornaments of road-sides and common pastures, is the bird's-foot clover, *lotus corniculatus*, known by its level tuft of bright yellow flowers, and the curious little pods, which are black when ripe, and range themselves so that the head resembles the claw of a bird; whence, in some places, they are known by the provincial name of "crow-toes." The principal characteristic of this genus must be looked for in the position of the two side petals or wings, which have their edges so directed as mutually to point towards and approach each other. The leaves are divided, like those of the clover, into three leaflets, and are clothed with soft hairs. The stem leans forward, and partly rests upon the ground, as if unable to support its own weight.

The last example we shall cite shall be the *ornithopus perpusillus*, or common bird's-foot. This is one of the prettiest little plants to be found upon our island. Its minute and delicate white flowers, streaked with red, adorn our pathways over heaths, and other waste grounds. The most ready character for botanical description, is the jointed nature of the pod. The leaves are in pairs, upon a common stalk or midrib, and contribute to form that model of elegance in miniature which the whole plant possesses. Should the reader ever stray alone across Hampstead Heath, during the summer months, he may supply the lack of good company by conversing with the beauties and characteristics of this little plant.

We have fulfilled our promise of describing only a few: the diligent collector will find many, not mentioned here, but which will not fail to please his sight, and gratify his curiosity. L.

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### THE BIBLE AND THE CREATION.

The Bible does not lay down before us this rule of faith and duty in the form of dry dogmatical positions, like the rules of an artificial grammar, or an analysis of some philosophical system; a lifeless skeleton of the truth; but it presents that truth in its living freshness, its native and lovely form, breathing the spirit of the living God. The revelation contained in the Bible resembles the revelation, as it may be justly called, which the same God has made of himself in the fields of nature, Rom. i. 19, 20. The Creator has not disposed his works according to the arrangements of human science. He has not spread out the vegetable world in the style of a botanic garden; nor has he given to us a ready-made system of zoology, or of the particular anatomy of our own bodies: but he has filled the earth with his magnificence in bounteous profusion, and in what a frigid pedant might call inextricable disorder; and he, as it were, says to us, "Go forth into the woods and the fields, collect plants and animals, observe living nature, study your own frame in its healthy action, as well as by aid from the dissection of the dead; and thus form your system." So also has he composed the book of revelation. In it are presented to us all the positions of truth and all the applications to experience and practice, which are suited to our present capacity and necessity; but they are scattered in a various and apparently irregular profusion. Our duty is to "search out of the book of the Lord, and read;" to employ our best faculties and capacities; and to bring every means of intellectual excitement and improvement, to draw from this inexhaustible fund of heavenly knowledge and holy delight. Let us not spare our endeavours to become more accurately and extensively acquainted with the Divine rule of faith and practice, and then we shall be the better enabled to make a proper application of it to othe[illegible]—*J. P. Smith.*

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### OLD HUMPHREY ON SOMEBODY AND NOBODY.

A FEW days ago I overheard a modest-looking young woman, seemingly a respectable servant, speak the following words in giving an account of a lady whom she had known. "She used to take a deal of notice of me, which was very kind of her: why should she notice me at all, for I was nobody?"

Another person might not have thought this worthy any attention; but I, who am frequently taken with trifles, was not only struck, but also much pleased with the observation. It was the first time that I had heard the expression, and most likely it will be long before I shall hear it again. Thousands of people try to make themselves appear "somebody," but it is a very rare case to hear any human being acknowledge himself or herself to be "nobody."

It set me thinking, not only of others, but of myself; for I felt conscious, that though the young woman had thought herself to be "nobody," my proud and deceitful heart had persuaded me to consider myself "somebody," all my days.

How is it with you? Are you "somebody" or "nobody?" Can you say in sincerity to the Searcher of hearts, "Lord, my heart is not haughty, nor mine eyes lofty: neither do I exercise myself in great matters, or in things too high for me?" Psa. cxxxi. 1.

It is said that the trees and plants of the earth are continually striving for air and light; that they are constantly trying to get above one another. Do you not think it to be the same with mankind? Do you not think that this is the case with us all? If you feel guiltless of this, so does not Old Humphrey. He can call to mind many instances wherein he has tried to pass himself off for "somebody," but he cannot remember one in which he has willingly represented himself as "nobody."

"I am as good as he is, any day;" "She shall not hold up her head above me;" and, "We are company for our betters," are expressions common enough: but, I question, if we were to travel through all England, from Newcastle to the Isle of Wight, and from the South Foreland to the Land's End, whether we should hear one single human being advisedly confess that he was "nobody."

Pride is the ruin of one-half of mankind. Even children, when they get together, boast of their fathers and mothers; and old men, with hoary hairs, speak with pride of the great things they have done, and the great people they have known: so that young and old wish to be thought "somebody."

There are in God's word a great number of precious promises to the humble, and a great number of awful threatenings to the proud. I will give you one of a sort, by way of sample. "Humble yourselves in the sight of the Lord, and he shall lift you up"—"Every one that is proud in heart is an abomination to the Lord; though hand join in hand, he shall not be unpunished." Now the promises are made to the "nobodies," and the threatenings to the "somebodies" of the world: have a care then to which class you belong.

You have heard of the rich man, who was

so fond of fine clothes and good living: no doubt he thought himself "somebody," and made other people think so too; but what did it all come to? You have heard, too, of Lazarus, who was a "nobody," for he asked the crumbs only which fell from the rich man's table, and yet you know what became of him. It happened to them both exactly according to the texts that I have given you: the proud "somebody" was brought low, and punished "where the worm dieth not, and the fire is not quenched," while the humble "nobody" was lifted up even to heaven.

Though the giant oaks and lofty cedars of the earth are laid low, yet do we lift up our heads like them, defying the storm. What a world of trouble, what a number of losses and crosses, what a succession of afflictions, are necessary, to convince us that we are "nobodies!" Indeed, Divine grace alone can effectually teach us true christian humility.

David was taught this lesson, when reflecting on the vast and mighty works of creation. "When I consider thy heavens, the work of thy fingers, the moon and the stars which thou hast ordained, what is man, that thou art mindful of him, and the son of man that thou visitest him?" If David was a "nobody" when he reflected on God's creation, surely you and I ought to be "nobodies" when reflecting on his grace.

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## CHEMISTRY. No. XIII.

### OXIDES.

It has been already stated, that several of the simple substances unite with certain proportions of oxygen, and are converted into oxides. It is, however, necessary that some more extended remarks should be made upon this class of compounds. The metals, and other bodies, are said to be changed into oxides, when they have not been combined with a sufficient quantity of oxygen to give them the properties of acids.

The metals are generally oxidized by exposure to the air; and by the decomposition of water, and the acids. Iron, as is well known, may be converted into an oxide by exposure to the air, for that which is called the rust of iron is, properly speaking, its oxide. By this union with oxygen, the weight of the metals is increased; in some instances nearly one-half of their original weight. This may be easily proved by filling a tobacco-pipe with pieces of iron that have been previously weighed, and afterwards exposing them for some time to a red heat.

It may be demonstrated that the change which takes place in the properties of metals when converted into oxides, is occasioned by their union with oxygen; for it is possible to abstract this substance, and to present the metal again in its pure state. This process, which is called the de-oxidation of metals, is sometimes effected by the agency of another metal, that is, of one having a greater affinity for oxygen than the oxidized substance, but more frequently by charcoal. If one ounce of red-lead (red oxide of lead) be mixed with half a drachm of charcoal in a mortar, and be then submitted to a sufficient temperature, the oxygen will combine with the charcoal, and the lead will be restored to its pure state.

Some metals will only absorb oxygen at a very high temperature: this is the case with gold, silver, and platinum; whilst manganese is in a few hours converted into an oxide by mere exposure to the air. In manufactories on a large scale, that of red-lead for example, ovens are provided for the purpose of keeping the metal in a melted state, continually accessible to atmospheric air.

But the metals vary in their capacity for absorbing oxygen, as well as in their attraction for this substance, a property that renders one metal useful to the chemist as an agent to attract the oxygen which may be in combination with another. Iron, tin, zinc, and manganese, are oxidized by the decomposition of water; an effect which is greatly increased if the temperature of the liquid be raised. This process is easily explained, and will serve as a general illustration. The metal has a stronger affinity for oxygen than is possessed by hydrogen; it will consequently exert an attractive influence on it, and destroying the union of the two gases which constitute water, the oxygen will combine with the metal, and the hydrogen will be lost.

Several of the metals, when dissolved in acids, are of frequent importance in the arts, but it is necessary to observe, that this solution can never be effaced unless the metal has previously united with oxygen. The nature of a combination of oxygen and a metal, the subsequent solution of the metal in an acid, and its revivification, is satisfactorily illustrated by an experiment mentioned in Parke's Catechism: "Take some clippings of copper, heat them in a mixture of 8 parts of water, 3 of sulphuric acid, (oil of vitriol,) and 1 of nitric acid, (aqua fortis,) and when the copper is dissolved, dilute the solution with water, and set it aside to crystallize. The crystals thus produced will be the true sulphate of copper, and will exemplify the formation of a metallic salt. If these crystals are now dissolved in a little water, and the polished blade of a knife immersed in the solution, the copper will be revived, and appear of its natural colour upon the knife. The oxygen having a greater affinity for the iron than the copper, the latter becomes deoxidized, and consequently insoluble in the acid; it therefore precipitates itself from the solution, and attaches itself to the knife in a metallic form. In the formation of sulphate of copper, by this process, the oxidizement of the metal, and its solution in the acid, seem to be only one operation; but the metal is undoubtedly first oxidized by the oxygen of the nitric acid, and then becomes soluble in the sulphuric acid."

The most important and useful of the oxides are of a metallic nature. Hydrogen is remarkable as a substance not capable of forming an acid with oxygen; the oxide it forms is water. Carbonic acid is a gaseous compound, containing 57 parts of carbon, and 73 of oxygen, and is not capable of supporting animal life. Nitrogen and oxygen, the gases that form atmospheric air, will also unite in other proportions, and form nitrous oxide, and nitric oxide. Nitrous oxide (protoxide of nitrogen) has a near resemblance, in some respects, to atmospheric air. It consists of two parts of nitrogen and one of oxygen, and may be procured by gradually applying heat to the nitrate of ammonia in a retort; the salt will melt, and the nitrous oxide be given off. It is a good supporter of combustion, but is chiefly remarkable for its property of producing, when breathed, very extraordinary and pleasurable sensations, and a strong inclination for laughter and violent muscular exertion, without leaving any languor or depression when the effect has subsided.

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## THE SUFFERINGS OF CHRIST.

Not only were Christ's sufferings for those that neither deserved nor sought after deliverance, but for those that were enemies: "When we were enemies, we were reconciled to God by the death of his Son," Rom. v. 10. "And you that were sometimes alienated, and enemies in your mind by wicked works, yet now hath he reconciled," Col. i. 21. And the enmity was so perfect, that it corrupted the best habits of our minds, and turned them into an abstracted kind of enmity. The very wisdom of the flesh is earthly, sensual, and devilish, James iii. 15; so that there was not only in our nature an absence of any good that might move God to do any thing for us, and an absence of that life which might be solicitous for itself; but there was a positive malignity in our nature against that God who should pardon; against that Christ who should atone; against that grace and Spirit who should sanctify. We were actuated with those vile affections and lusts, that looked upon a Saviour with no less aversion and spite than those devils did that cried out of the possessed man, "Art thou come to torment us before our time?" And yet for these, and such as these, our Saviour died. Nay, some of those who had actually joined to shed his blood found the efficacy of that very blood which they shed, Heb. xii. 24, not crying for revenge against them, but mercy for them, and healing those who had cruelly spilt it. The efficacy of that blessed prayer of his, "Father forgive them, they know not what they do," within some few months after his death did first wound their hearts with a sense of their guilt, and then healed them by the application of his blood, Acts ii. 23, 37.—*Sir M. Hale.*

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## COCK-CROWING IN THE EAST.

It has been often remarked, says Mr Arundell, in illustration of Scripture, that in the eastern countries the cocks crow in the night; but the regularity with which they keep what may be called the watches, has not been perhaps sufficiently noticed. I will, however, confine myself to one, and that is, between eleven and twelve o'clock. I have often heard the cocks of Smyrna crowing in full chorus at that time, and with scarcely the variation of a minute. The second cock-crowing is between one and two o'clock; therefore, when our Lord says, "In this night before the cock crow twice," Mark xiv. 30, the allusion was clearly to these seasons. In fact, this was altogether so novel to me at my first arrival in Smyrna, that I could calculate the hours of the night with the utmost precision, by what I termed my electrometer, as by my watch.—*Discoveries in Asia Minor.*

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EASTERN SERVANTS.

## SCRIPTURE ILLUSTRATIONS.—No. XVII.

"Behold, as the eyes of servants look unto the hand of their masters, and as the eyes of a maiden unto the hand of her mistress; so our eyes wait upon the Lord our God, until that he have mercy upon us."—Psalm cxxiii. 2.

GREAT reverence in these expressions. Servants or slaves, in the east, pay the most profound respect to those whom they serve. From their inferiority, they dare not speak in their master's presence. Every command is given them in silence, and the sign is always expressive, and well understood. Hence the mutes in the Turkish seraglio. In Egypt and in Persia the like custom prevails.

Pococke says, that at a visit in Egypt, every thing is done with the greatest decency and the most profound silence; the slaves or servants standing at the bottom of the room, with their hands joined before them, watching with the utmost attention every motion of their master, who commands them by signs. So also De la Mottraye says, that the eastern ladies are waited on even at the least wink of the eye, or motion of the fingers, and that in a manner not perceptible to strangers.

In these illustrations we can then see the expressive beauty and force of the psalmist's language. The godly man is, indeed, not the slave of his Master, for his service is "perfect freedom;" but as the eastern servant, in silent reverence, stands with folded hands, attentive eyes, and ready feet, to do his master's commands, and in all respects submissive to his will; and as the maid, in like manner, regards the motions of her mistress's hand, so does he, with profound reverence, a patient mind, and obedient hands and feet, ever stand prepared to do the commands of his Lord. And those commands he knows are not grievous. They are, however, not always explained to him; "What thou knowest not now, thou shalt know hereafter." They are also sometimes difficult; but in keeping them "there is an exceeding great reward."

The psalmist wrote this psalm when the church of God was in great distress. There is a season for the servant of God to wait, and to look for the motion of that hand which can alone afford supply, insure protection, or effect deliverance. "This is our God," can every good man say: "we have waited for him." I. C.

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## NINETY-FOUR FOLIO VOLUMES.

MANY are the instances on record of human perseverance, and the following is a recent illustration of what may be effected by individual attention to one undertaking.

The late Francis Cox, Esq., of Brompton Crescent, a gentleman of original taste and uncommon perseverance, began, many years ago, to cut out of the public journals such scraps as, in his estimation, possessed interest. These scraps, forming altogether a singular collection of whimsical, interesting, and instructive facts, he continued, from time to time, to paste on the blank leaves of books prepared to receive them, little thinking what mass of matter would, by this means, be at length accumulated. These scraps, before his death, which took place a short time ago, amounted to no less than ninety-four folio volumes. It was his intention to make up the number to a hundred, and then present them to his majesty; but this intention was abandoned, and the ninety-four volumes, entitled "Fragmenta," were bequeathed by him to the British Museum, provided they were thought worthy the acceptance of that institution. It is needless to add, that the volumes have been sufficiently estimated to be added to the splendid collection of books at the Museum, and that no doubt many a curious eye will investigate them, and many an antiquarian spirit ponder over them, with interest and satisfaction.

Ninety-four folio volumes of scraps, having no necessary connexion with each other, must of necessity present an entertainment of no ordinary kind, offering something suitable to every taste; a sort of flowery labyrinth wherein the reader may willingly lose himself; the man of science and reflection recreate and refresh his memory; and the lover of the wonderful and marvellous find abundant sources of gratification.

Let us not, however, be content with this record of "Fragmenta," without drawing from it that lesson which may afford us profit. If one individual by perseverance has effected so gigantic a work, what may not we perform by the same perseverance in some christian, some benevolent, or some useful undertaking?

Let it animate us to increased exertion in every laudable enterprise we engage in, that our mole-hill efforts may, by patient perseverance, become mountainous in the cause of religion and virtue.

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## CHEMISTRY.—No XIV.

### ACIDS.—NO. I.

"THE term acid explains itself by its ordinary acceptation; for though there may be a great diversity in the tastes excited by different acid bodies, both with respect to intenseness and quality, yet no language has furnished distinct names for this variety. Sorrel, vinegar, cream of tartar, lemons, tamarinds, and a great many other bodies, are said to be acid when tasted."—*Watson's Essays.*

According to the theory of Lavoisier, which had numerous supporters, oxygen is the acidifying principle. But it has been proved, that several of the acids do not contain oxygen; and therefore this cannot be considered as the origin of acidity. The acids are found to exist in a solid, a liquid, or a gaseous form.

"The acids are by far the most important class of bodies in chemistry. It was by their means, indeed, by studying their properties, and by employing them as instruments in the examination of other bodies, that men of science laid the foundation of chemistry, and brought it to that state in which we find it at present. The nature and composition of acids, therefore, became a very important point of discussion, and occupied the attention of the most eminent cultivators of the science." —*Thompson.*

One important distinguishing property of the acids is their power of changing the blue, green, and purple colours of vegetables into red. They have generally a great affinity for water, and will combine with it in almost every proportion. They will also unite with the earths, alkalies, and most of the metallic oxides, constituting another class of compound substances, called salts.

The acids were formerly arranged by chemists under the general classes, mineral, vegetable, and animal, according to the source from which they were obtained. The division now adopted is founded upon the number of elementary principles which enter into their composition. The first class embraces all those acids which contain two principles; the second class includes those which are composed of more than two principles.

We shall first attempt to describe the properties of some of the acids belonging to the first class. Sulphuric acid is one of the most important, and may be here mentioned. It was once called by chemists the oil of vitriol, and in commerce is still known by the same name. This acid is composed of two volumes of sulphur and three of oxygen, and is procured by burning sulphur, under peculiar circumstances, in contact with oxygen. When pure, it is transparent and colourless, without smell, possessed of a strong acid taste, and very corrosive in its nature. A great heat may be produced by the mixture of sulphuric acid and water; if four pounds of the acid be united with one pound of water, the temperature of the mixture will be about 300 Fahrenheit. This acid is exceedingly useful to the practical chemist and the manufacturer.

By the slow combustion of sulphur, in contact with oxygen, a gas may be formed which, when condensed into a fluid, is found to contain a smaller proportion of oxygen than the acid of which we have spoken. It is called the sulphurous acid, and possesses properties differing from those of the sulphuric. As a gas, it is invisible; has a strong suffocating smell, readily combines with water, and extinguishes flame. It consists of one volume of sulphur and one of oxygen.

It may be here mentioned that a substance, combined with the greatest proportion of oxygen it is known to absorb, has the termination *ic* affixed to the generic name; and when with a lesser proportion, the ending *ous* is added. Thus we have the sulphuric and sulphurous acids, the nitric and nitrous.

Carbonic Acid is a compound of carbon and oxygen, in the proportion of six parts of the former to sixteen of the latter, and when discovered, was called fixed air. It is heavier than atmospheric air, and is not capable of supporting combustion or respiration. It is an ingredient of atmospheric air, and constitutes about 1-1000th part. If water be impregnated with this acid, it will acquire an acidulous and agreeable flavour. The briskness of bottled porter, ale, cider, and other fermented liquors, is owing to the carbonic acid they contain. The sponginess of bread is owing to the same cause. This acid, when found as a gas, in caverns and mines, is called by excavators the choke-damp. In all parts of the world, it is found in combination with mineral substances: chalk, marble, and limestone consist of lime and carbonic acid.

Carbonic Acid gas may be procured by pouring a small quantity of sulphuric air upon powdered chalk, and still more readily from the brewer's fermenting tun, when the beer is in a state of fermentation. This gas is much more heavy than atmospheric acid, and has the property of extinguishing flame. Both these statements may be proved by placing a lighted taper in a long open glass vessel, and then holding the mouth of a phial containing the gas over it. The gas will descend to the bottom of the glass, and the light will be extinguished.

Nitric Acid, commonly called aqua fortis, is, when pure, colourless and transparent. It is composed of ten parts of nitrogen and twenty-five of oxygen. It is very corrosive, and has the property of imparting a permanent yellow colour to the skin. The aqua fortis of commerce has generally a yellow hue, in consequence of its containing a small portion of muriatic acid. Properly speaking, it should be called the nitrous acid. The nitric acid is very volatile, and, when exposed to the air, emits an abundance of white fumes. It generally contains about 2-5ths of water in solution. It is extensively used in manufactures; in the arts of dyeing and gold refining, among others. By pouring this acid upon finely-powdered charcoal, the latter will instantly ignite and emit brilliant sparks.

## NORTHUMBERLAND HOUSEHOLD BOOK.

The most perfect notion of the living and domestic arrangements of the old English nobility and gentry will be found in the entries of what were called the Household Books of the time. One of the most celebrated of these records is the Northumberland Household Book, being the regulations of the establishment of the fifth earl of Northumberland, at his castles of Wrenill and Lekinfield, in Yorkshire, begun 1512. No baron's family was on a nobler or more splendid footing. It consisted of one hundred and sixty persons, masters and servants; fifty-seven strangers were reckoned upon every day; on the whole, two hundred and twenty-three. During winter they fed mostly on salt meat and salt fish; and with that view there was a provision of one hundred and sixty gallons of mustard per year; so that there cannot be any thing more erroneous than the magnificent ideas formed of "the roast beef of Old England." On flesh days, (that is, when meat was not forbidden by the roman catholic religion,) through the year, breakfast for my lord and lady was a loaf of bread, two manchets,* a quart of beer, a quart of wine, half a chine of mutton, or a chine of beef boiled. On meagre days, (or when meat was forbidden,) a loaf of bread, two manchets, a quart of beer, a quart of wine, a dish of butter, a piece of salt fish, or a dish of buttered eggs. During Lent, a loaf of bread, two manchets, a quart of beer, a quart of wine, two pieces of salt fish, six baconed herrings, four white herrings, or a dish of sprats. There was as little variety in other meals, except on festival days; and this way of living was, at the time, high luxury. Fowls, pigeons, plovers, and partridges, were prohibited as delicacies, except at my lord's table. The table-cloth was washed about once a month; no sheets were used; and only forty shillings were allowed for washing throughout the year. The family rose at six in the morning, dined at ten, and supped at four in the afternoon; and the castle gates were shut at nine. Mass was said in the chapel at six o'clock, that all the servants might rise early. The earl passed the year at three country seats, but he had furniture only for one: he carried every thing along with him, beds, tables, chairs, kitchen utensils; and seventeen carts and one wagon conveyed the whole: one cart sufficed for all his kitchen utensils, cooks' beds, &c. There were in the establishment eleven priests, besides seventeen persons, chanters, musicians, &c. belonging to the chapel. No mention is made of plate, but only hiring of pewter vessels. Wine was allowed in abundance for my lord's table, but the beer for the hall was poor indeed; only a quarter of malt being allowed for two hogsheads. The servants seem all to have bought their own clothes from their wages. Every thing in the household was done by order, with the pomp of proclamation; and laughable as it may now seem, an order was issued for the right making of mustard, beginning, "it seemeth good to us and our council."

In this apparently sumptuou[illegible] establishment, ev[illegible] n the person who kept the account of oats and [illegible] orn used in the stables had a kind of title: he was called the clerk of the avenar; and one of the towers of the outer court of Alnwick Castle is, to this day, called the Avenar's Tower. But there were only two cooks, a groom of the larder, and a child of the scullery, to victual this numerous family of two hundred persons.

The regulations of this household do not, however, accord with our ideas of hospitality. All joints of meat were entered and accounted for by clerks: if a servant was absent a day, his mess was struck off: if he went on my lord's business, board wages was allowed him, 8*d.* a day for his journey in the winter, 5*d.* in summer: when he stayed in a place, 2*d.* a day was allowed him, besides the maintenance of his horse. The under servants ate salted meat almost throughout the whole year, and with few or no vegetables; so that they had a very bad and unhealthy diet. The earl kept only twenty-seven horses in his stable at his own charge: his upper servants had allowance for maintaining their own horses. When on a journey, he carried thirty-six horsemen along with him; together with beds and other accommodation.—*Domestic Life in England.*

## MEDICAL PROPERTIES OF LEGUMINACEOUS PLANTS, &c.

THE first that we shall notice as belonging to this family, shall be the *Tamarindus Indica*, or Tamarind Tree, since its beauty and its grateful fruitage entitle it to a pre-eminence in our regards. The fair trunk of the tamarind is surmounted by a tuft of wide-spreading branches, which bow their soft green twigs towards the earth from which they derive the material for their growth and developement. Amidst the delightful foliage, at certain seasons of the year, may be seen numerous diffusive clusters of various flowers, imparting by their tincture a lovely contrast to the verdure around them. These flowers are succeeded by as many pods of a most irregular and fanciful description. They are variously incurved, bent sideways, swelled out or prolonged, so that it would be difficult to meet with a pair upon the same tree, which had much resemblance to each in point of shape and size. But the varying form and dimensions of the pods, instead of impeding the beauty of the tree, add to its effect by varying the extreme regularity of the branches. Just as, in painting, the introduction of a few broken lines, the fragment of a ruin, or a leafless tree, relieves the sameness of even proportions,and greatly increases the effect of the picture. The pods are at first composed of a dense substance, penetrated with numerous woody fibres, after the resemblance of bark. In the unripe state they possess an acid remarkable for its poignancy, so that it is impossible for the tasters to keep their features in their natural position. This sourness is abated as they ripen, and tempered with a flavour that renders them peculiarly acceptable to the feverish patient. The Arabian physicians were the first who prescribed the tamarind as a medicine; the Greek and Roman writers seem not to have known of its existence. The tamarind is a native both of the East and West Indies, and though authors notice a difference between the pods brought from those opposite regions, they are doubtless the production of one and the same tree, since, as we have stated from our own observation, they are so unlike each other when growing upon the same tree. The tamarind is compounded of *tamar*, the Hebrew and Arabic term for a palm or date-tree, and *Ind*, India. From which we may collect, that the first who named them were unacquainted with their origin; since there is not the remotest affinity between the tamarind and the date-tree.

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* Small lo[illegible]ves of fine bread.

There is no medicament with which we are better acquainted than liquorice: its agreeable and spicy flavour, and its efficacy in soothing the inflammatory action of colds, have rendered it a general favourite. The shrub from whose root it is extracted belongs to the leguminous family; that is to say, its blossom is similar in conformation to that of a pea, and its seeds are ripened in a pod. Its systematic name, *glycyrrhiza*, signifies, a sweet root, and is therefore a very proper appellation. The *glycyrrhiza glabra* is a native of Spain, but is now cultivated very commonly in the neighbourhood of London. Nor does the liquorice prepared from the root of the cultivated plant, seem inferior to that which is obtained from it when growing in its native soil. It is not liable to fermentation, and therefore may be taken without any fear of disordering the stomach, while the power it has of preventing thirst renders it peculiarly acceptable as a comfort in slight fevers, where the patient feels an uneasy dryness, accompanied by a craving after something that is not within reach.

*Astragalus tragacantha*, the goat's thorn or milk vetch.—The most obvious mark of distinction in the astragalus is found in the pod, which is two-celled; the inner ridges which we observed in the pod of the pea are prolonged so far as to meet and unite. The goat's vetch now under consideration is a native of Asiatic Turkey, and the southern parts of Europe; particularly of Italy, Sicily, and Crete. Tournefort found it growing plentifully about Mount Ida, where he examined the plant in the month of July, when both the bark and the wood were discovered to be replete with gum tragacanth, which by the impulse of the sun's beams forces its way through the bark, and concretes into irregular lumps or long worm-like pieces, bent into a variety of shapes. The goat's thorn has not its name for nothing; for the stems of this shrub are fenced about with long sharp-pointed thorns, so as to exhibit a very formidable appearance. The small leaflets are ranged in a series on each side of a midrib ending in a pointed thorn. This circumstance intimates, what has often been said, that thorns are stunted leaves, which for lack of nutriment have been taught to put on a less attractive form. The mountainous region of Lebanon, so familiar in description to the students of Scripture, abounds in a shrub of the same genus, which likewise yields gum tragacanth. The chief distinctions between the two shrubs are these—the cretan or common astragalus has its stem blackish, and its leaves downy, while the stem of the Lebanon astragalus is yellow, and its leaves are smooth. The best gum tragacanth, which is more generally known under the name of gum dragon, is of a nearly transparent whiteness, and very unlike those dingy parched fragments which are often sold for it. Its fineness depends upon the health of the shrub and the freedom with which the gum flows when the incision is made. Gum tragacanth possesses the softening qualities of gum arabic, and even, it would seem, in a higher degree; but it is not so readily dissolved in water as that well-known drug. Either of them may be used with kindly effect, when the surfaces of the internal passages of the body are inflamed by dysentery, and other disorders of the bowels. In cases of this malady, it is customary to administer the laudanum which is given at night in a glass of gum-water. The writer of this has long been in the habit of using gum tragacanth, or, to call it by its more frequent name, gum dragon, in fastening botanical specimens to paper. It has greatly the advantage of gum arabic, wherever elegance of effect is aimed at. To prepare it for this purpose it should be put into a wide-mouthed vial, and a quantity of hot water poured upon it, and then be allowed to stand for a few days till it gives out an acid smell. It should be very freely spread over the surface of the dried plant, before it is placed upon the sheet of paper destined for its reception. If a fold or two of flannel be laid upon the plant with the addition of a heavy weight, it will in about two hours present a neat and beautiful appearance, without betraying the slightest traces of the gum by which it is attached. The best kind, which should when possible be obtained, is expensive, but a small quantity will render a vial full of water sufficiently adhesive; while, in dissolving, it will swell to a hundred times its original size. This gum was formerly much in use for giving a stiffness to various kinds of cotton cloth; but its employment in this way has been superseded by arrow-root, which is cheaper, and contains a large proportion of gluten, the ingredient that imparts the quality just mentioned.

After this description of the goat's-thorn and its produce, it will be convenient to notice the *mimosa nilotica*, which furnishes the gum arabic. The *mimosa nilotica*, or Egyptian thorn, bears its flowers in little round heads like the rest of the mimosas, and has its leaves divided and subdivided into numerous pairs of leaflets. It is several feet high, with a smooth bark, defended however by many long sharp-pointed spines. Though denominated from Egypt, it grows in vast abundance over the whole continent of Af ica. Gum arabic, on account of its glutinous quality, is often used in coughs, hoarseness, and other catarrhal affections, to check the effect of acrimonious humours, and supply the loss of abrated mucus.

*Spartium scoparium*, common broom.—Dr. Cullen found the broom, as a decoction, in great use among the common people; from thence he was led to make trial of it, and discovered that it answered extremely well as a purgative, when two table-spoonfuls were given every hour till it operated. The ashes of broom have been much used in dropsies, on the authority of Sydenham, whose account of their good effects have been since confirmed by the testimony of Dr. Monro, and other writers. The broom, by incineration or reducing to ashes, is found to contain an alkaline salt, upon which its efficacy entirely depends. The seeds and flowers of broom are said to be emetic; which may be the case, though the flowers are used as a pickle, and the seeds roasted as a substitute for coffee; for vinegar and heat may in one case neutralize, and in the other dissipate this property. L.

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## GOD'S OMNISCIENCE AND HOLINESS DISPLAYED IN THE GOSPEL.

Mark his Omniscience. God knew the secrets of all hearts, the wants of every soul, the full requirements of the law, the utter insufficiency of man to save himself, when he gave Jesus Christ to be the Saviour of as many as, through grace, will be saved through Him. Infinite wisdom is displayed in every provision of the gospel, which is evidently designed for a creature fallen, sinful, guilty, helpless, and lost. It provides fully for the glory of every attribute of God, and also for every want of the soul of man.—Next mark the Holiness of God, as seen in Jesus Christ. It beams forth in many rays from that Sun of Righteousness. How infinitely holy was God, that no other way of access could be righteously opened for sinners to himself, but through his only-begotten and well-beloved Son becoming a man of sorrows, acquainted with grief; and, at length, as man, suffering, wounded, bruised, and even dying upon the cross for our transgressions and iniquities! Surely, on that cross, the holiness of God is stamped in characters of blood. Often in spirit approach that cross, my fellow-sinners. When disposed to treat sin with levity, draw near by faith to that cross, reeking with sacred blood, and read there, and reflect, how evil a thing is sin! how holy is God! You see again the holiness of God in the personal character of Jesus Christ. He is the model of human perfection. He knew no sin. He was pure in heart and life. It was his meat and drink to do his Father's will. He loved God with all his heart and soul, and his neighbour as himself. Attempts have, at various times, been made to fix on him some charge of sin; but all have failed, and have only served to manifest more clearly his sinless holiness. Although more than eighteen centuries have passed since his birth, and although his character has been sifted and scrutinized, as that of no other man ever was, by Pharisees and Sadducees, by philosophers and sages, by infidels and atheists, by sects and parties, by friends and foes, yet, unto this day, no charge of sin was ever proved against him. His character stands alone among men. There is none equal or second thereto. All other men must stand afar off, and gaze with admiration; yea, rather, they must abase themselves at the contrast, and cry, How glorious is God! how vile is man! And do you not see the holiness of God in this also, that while the gospel of Christ offers you a full and free pardon, and an entire justification, yet it tells every soul among you—This is not that you may continue in sin? God forbid! In order to this, you must be born again. You must have a new heart, a new spirit, a new life. "Without holiness no man shall see the Lord," Heb xii. 14; but in acquiring this, God offers you, through Christ, the grace and strength of the Holy Spirit to encourage, sustain, and effectually enable. Thus no man can gain a right view of God, as he proposes himself in the gospel, without having the thought continually pressed upon his soul, "God is infinitely holy; but I am altogether unholy."—*Hambleton.*

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## CONSISTENCY OF THE SACRED WRITERS.

THERE is one argument which impresses my mind with particular force. This is, the great variety of the kinds of evidence which have been adduced in proof of christianity, and the confirmation thereby afforded of its truth: the proof from prophecy; from miracles; from the character of Christ; from that of his apostles; from the nature of the doctrine of christianity; from the nature and excellence of her practical precepts; from the accordance between the doctrinal and practical system of christianity, whether considered each in itself or in their mutual relation to each other; from other species of internal evidence, afforded in the more abundance, in proportion as the sacred records have been scrutinized with greater care; from the accounts of contemporary, or nearly contemporary writers; from the impossibility of accounting, on any other supposition than that of the truth of christianity, for its promulgation and early prevalence: —these and other lines of argument have all been brought forward, and ably urged by different writers, in proportion as they have struck the minds of different observers more or less forcibly. Now granting that some obscure and illiterate men, residing in a distant province of the Roman empire, had plotted to impose a forgery upon the world, though some foundation for the imposture might, and indeed must have been attempted to be laid, it seems, at least to my understanding, morally impossible that *so many different species of proofs*, and all so strong, should have lent their *concurrent* aid, and have united their *joint* force in the establishment of the falsehood. It may assist the reader in estimating the value of this argument, to consider upon how different a footing, in this respect, has rested every other religious system, without exception, which was ever proposed to the world, and indeed every other historical fact of which the truth has been at all contested.—*Wilberforce.*

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## BENEFICIAL EFFECTS OF ATMOSPHERIC AIR.

I WOULD wish to observe how beautiful an instance the history of atmospherical air affords of the multiplicity of beneficial effects, of very different characters, produced by one and the same agent; and often at one and the same moment. While the air of the atmosphere serves as the reservoir of that mass of water from whence clouds of rain, and consequently springs and rivers are derived, at the same time it prevents, by the effect of its pressure on their surface, the unlimited evaporation and consequent exhaustation of the ocean, and other sources from whence that mass of water is supplied. And again, while the agitation of the air contributes to the health of man, by supplying those currents which remove or prevent the accumulation of local impurities, it at the same time facilitates that intercourse between different nations, in which the welfare of the whole world is ultimately concerned. And lastly, while in passing from the lungs in the act of expiration, it essentially forms the voice; it at the same time removes from the system that noxious principle, the retention of which would be incompatible with life.—*Professor Kidd.*

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## ANTICIPATION OF TROUBLE.

EXPECT troubles before they come. The very state of the world is uncertain and unstable, and for the most part stormy and troublesome. If there be some intervals of tranquillity and sedateness, they are commonly attended with longer periods of unquietness and trouble: and the greatest impressions are then made by them when they surprise us and come unexpectedly. When the mind is prepared for them by a kind of anticipation, it abates the edge, and keenness, and sharpness of them. By this means, a man, in a great measure, knows the worst of them before he feels them; which renders them not so smart and troublesome to sense as otherwise they would be. This pre-apprehension and anticipation of troubles and difficulties is the mother of prevention, where it is possible; and where it is not, yet it is the mother of patience and resolution when they come. Bilney, the martyr, was wont, before he suffered, to put his finger in the candle, to habituate himself to patient undergoing of his future martyrdom: by this means he, in a great measure, knew the worst of it, and armed himself with resolution and patience to bear it. Men are apt to feed their fancies with the anticipation of what they hope for and wish in this world, and to possess it in imagination before they attain it in fruition; and this makes men vain: but if they would have the patience sometimes to anticipate what they have just cause to fear, and to put themselves under a pre-apprehension of it, in relation to crosses and troubles, it would make them wise, and teach them a lesson of patience and moderation before they have occasion to use it; so that they need not then begin to learn it, when the present pressure renders the lesson more difficult. This was the method our blessed Lord took with his disciples, frequently to tell them beforehand what they must expect in the world, Matt. x., and in divers other places, telling them they must expect in this world the worst of temporal evils, that they might thereby be prepared to entertain them with resolution and patience, and might habituate their minds for their reception.—*Sir M. Hale.*

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### A PLEASING ACQUAINTANCE.

The following particulars are given in a letter by the late Rev. Joseph Hughes, M. A.:—"The quiet situation and beautiful scenery of Thornbury give it the appearance of a nest placed in a recess of the world, and I passed a number of days in that feeling of complacency which is imparted by goodness and sense in a rural abode. A most pleasing man that W. R. In about an hour and a half we were on the familiar terms of long acquaintance, and gilded each subsequent intercourse with the most copious pouring out of mutual sentiment. We spent one whole day between the luxuries of the farmers' kitchens and wandering on the banks of the Severn, which we laid under contribution for a wide diversification of fancies and arguments. He is of that class of men who never think of bartering their friendly qualities. One has neither to covet them nor purchase them. There they are ready for you; and if you have only sense to estimate and feeling to reciprocate them, they come forward to meet you without manœuvre, without counting steps, without punctilious adjustment. His first actions seem to say, 'I have a heart,—I hope you have one?' He is like one of those banks on which Nature has displayed her own violets and roses, and seems to say to Art—'I don't want you; I despise you.' He is one of the few favourites whom Nature chose to retain, in order to present to Wisdom, when she sold the rest of the world to be cut and painted and twisted into fashion, formality, and insipidity, or that kind of low cunning which gives me the idea of a man distilled."

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### CONFORMITY TO CHRIST.

The life of God in us consists in conformity to Christ; nor is the Holy Spirit, as the principal and efficient cause of it, given to us for any other end but to unite us to him and make us like him! Wherefore the original gospel duty, which animates and rectifies all others, is a desire for conformity to Christ in all the gracious principles and qualifications of his holy soul, wherein the image of God in him doth consist. His meekness, lowliness of mind condescension unto all sorts of persons, his love and kindness to mankind, his readiness to do good to all, with patience and forbearance, are continually set before us in his example. With respect unto them it is required, that the same mind be in us that was in Christ Jesus, and that we walk in love, as he also loved us, Eph. v. 2, Phil. ii. 5, Rom. viii. 29.—*Owen.*

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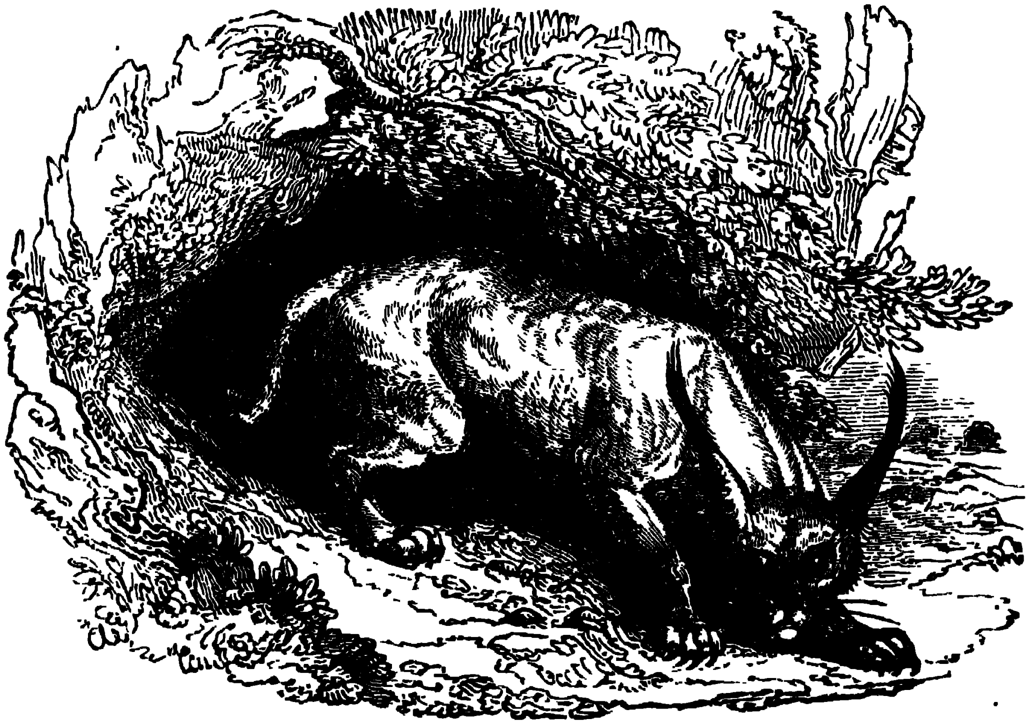

THE PERSIAN LYNX, OF CARACAL, (FELIS CARACAL.)

THE ancients, whose love of the marvellous led them to mingle fable and facts together, and whose ignorance of the laws of creation prevented their separating error from truth, were well acquainted with the present animal, which, though very much smaller than the lion, and little to be feared, divided with that tyrant of the wilderness the fame and wonder of the world. Not content with attributing to the lynx the characters of cunning, activity, and almost untameable ferocity, which it most assuredly displays, they endowed it with supernatural powers, existing only in a fertile imagination. Its sight was believed to be so keen as to penetrate through the densest bodies, and to suffer nothing to escape unobserved. The fact is, that the Persian lynx or caracal differs in no essential from the rest of the cat tribe to which it belongs, except that it is more restless, and certainly less patient of confinement.

Its eye is bright and large, but not more so than in many others of the genus; its limbs are comparatively large, and very muscular, and its whole conformation indicates great activity. There is, however, in its countenance a very peculiar expression, caused, perhaps, in a great measure by the tufts of long black hair which terminate the points of the ears, and which contrast in colour with the uniform reddish or yellowish brown of the rest of the head and body. When irritated, as we have often observed the lynx, the ears are thrown back, the eyes glare with malignant fury, and the formidable teeth are displayed, while at the same time the animal utters a deep hissing, not unlike that of a cat, and very different from the short growl of the lion or tiger. In all the examples of this species which we have had an opportunity of noticing in captivity, we never yet saw one that would suffer the approach of strangers to its den without manifesting these tokens of displeasure; while the larger animals of the feline race become accustomed to the public gaze, and indifferent to the approach of bystanders. The lynx, closely retiring to a corner, and secluding itself as much as possible, surveys the scene around with dislike and suspicion, and if intruded upon more decidedly, betrays the most unequivocal signs of its unbroken and unyielding temper.

The native countries of the lynx are Persia, India, Turkey, Nubia, and other portions of the East, where it inhabits the wooded districts, preying upon birds, monkeys, squirrels, and the smaller quadrupeds. It avoids the face of man, but becomes dangerous if hard pressed or wounded. Most of its time is spent among the branches of the forest, and so subtle is its attack, so unperceived its approach, that until the fatal spring be taken, the victim is unconscious of his jeopardy. In this manner the splendid peacock, roosting on his perch in the recesses of the wood, or the monkey, sleeping on the bough, is surprised and destroyed. Though the examples which we have seen have been invariably fierce and unmanageable, the lynx appears to have been occasionally rendered tame, and even used for the chase. By the classic poets of antiquity it was allegorically fabled as having been yoked to the car of Bacchus, the conqueror of India. In size, the Persian lynx equals a dog of moderate stature; the tail is short, the general contour light, but vigorous. It may be as well to state, in conclusion, that the *fur* known in commerce as that of the *Lynx*, is not procured from the present animal, but from one or two very different species, viz., the Russian lynx, (*Felis lynx*,) a species also from the north, termed *Felis cervaria*, and the Canada lynx, (*Felis Canadensis*,) &c. M.

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## AFFECTATION OF DISCERNMENT.

Where one man can be found possessing judgment and superior discrimination, ten may be seen who lay claim to these qualities without possessing them. Some men, indeed, cannot move without giving themselves airs on account of their supposed shrewdness; and this turn of mind is equally visible, whether exercised in reference to the highest works of art, or the lowliest concerns of common life.

A bustling traveller at an inn, merely to show that he is a judge of good wine, rings the bell violently, and sends back his decanter, telling the waiter that the wine is as flat as ditch-water. Away goes the waiter, and presently returns with the same liquor in another shaped bottle, assuring the blusterer that he has been to another bin for it; the wine is then pronounced to be what wine ought to be, and is drunk with the consciousness of superior discernment.

A Londoner passes through Sheffield, Birmingham, and Coventry, but buys nothing. On his return to London, he purchases, at a high price, a case of razors, a set of gilt buttons, and a watch. "Say what you will," says he, "there are no articles in the world like those that are *town-made;* it's worth while paying a little more for them." The razors cut well, the gilt buttons wear capitally, and the watch goes admirably. The first were made in Sheffield, the second in Birmingham, and the last in Coventry.

A certain lord was once examining a plate of copper, on which was an engraving, executed by an eminent artist. He took the copper-plate in his hand, admired the freedom, force, and delicacy of the principal figure, which was that of Justice; but, with an air of self-satisfaction, expressed his regret that the artist should have committed such an oversight as to put the sword into the left hand of the figure instead of the right. "Now here," said he, turning to a beautiful print of the same subject, which happened to be near, "the sword is where it ought to be." The artist smiled in his sleeve at the simplicity of the peer, and allowed him to depart without telling him that the print which he admired was a proof impression, taken from the very copper-plate he had censured.

An amateur in painting, whose ignorance of the art was equal to the high estimate he had formed of his own discrimination, once had a full opportunity of manifesting his want of discernment: two friends, willing to purchase a laugh at his expense, played off the following stratagem. One of them invited him to inspect an original painting of a warrior. He attended, and believing the performance to be that of one of the olden masters, praised it to the skies. The eye was lit up, he said, with animation; the arm had an expression of power, and the strength and tone of the whole stamped it an original. Before he left the house, the painting was secretly conveyed to the premises of the other friend, and put into another frame. The amateur was decoyed to the place, where, among other paintings, he again saw that of the warrior. "O," said he, with a knowing shake of his head, when asked if he considered it to be an original, or a copy, "I have seen too many paintings to be in doubt a moment about the matter. There is no fire in the eye, no energy in the arm, and a general air of feebleness pervades the whole. It is but a copy, I assure you, and a very indifferent one too."

Sodorini, the chief standard-bearer of Florence, was a man more desirous to gain the reputation of possessing a correct judgment in works of art than disposed to labour in the pursuit of acquiring real information. Having ordered a statue of Michael Angelo, he went to inspect it as soon as finished. So successfully had the sculptor exercised his art, that the statue appeared absolutely perfect, and Sodorini was not a little puzzled how to exercise his criticism in any other way than that of general commendation. The strong desire, however, to show something more than an ordinary degree of discrimination, urged him to examine the figure more rigidly. He advanced, and drew back; viewed it in different lights, and, in short, tried his utmost to discover an error, however trivial. Reduced to the necessity of saying something, he ventured to remark, that a few touches might possibly improve the nose.

Angelo, who well knew the failing of Sodorini, immediately took up his chisel, and, concealing a little marble dust in his hand, pretended to take off a slight portion from the bridge of the nose. Hearing the taps on the top of the chisel, and seeing the marble dust fall, Sodorini did not suspect the stratagem, but, overjoyed at having convinced Angelo of the correctness of his taste, cried out, with exultation, "Ah, Angelo! you have now given it an inimitable grace!"

The traveller, the Londoner, the peer, the amateur, and the standard-bearer, furnish different specimens of the same infirmity; and well will it be for us if, while we smile at their folly, we ourselves avoid the affectation of superior discernment.

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## INSECTS.—NO. XXXIX.

### (*Touch.*)

Of all the senses with which we are endowed, touch is the only one that is not confined to particular organs, but is dispersed over the whole body. Insects, however, from the indurated crust with which they are often covered, feel sensibly, it is probable, only in those parts where the nerves are exposed, by being covered with a thinner epidermis, to external action. Not that they cannot feel at all in their covered parts; for as we feel sufficiently for walking, though our feet are covered with the thick sole of a boot or shoe, so insects feel sufficiently through the crust of their legs for all purposes of motion. Besides, the points that are covered by a thinner cuticle are often numerous; so that touch, at least in a passive sense, may be pretty generally dispersed over their bodies, but active or exploring touch is confined to a few organs; as the antennæ, the palpi, and the arms.

Huber has described a curious experiment:—"I divided," he says, "a hive into two portions by means of a grating, executing the operation with such expedition and delicacy, that the smallest agitation was imperceptible, nor was a single bee injured. The bars of the grating admitted the free circulation of air, but were too close for the reciprocal passage of the bees. I did not know which half contained the queen, but the tumult and buzzing in No. 1, soon assured me she was in No. 2, where quietness and tranquillity prevailed. Still preserving the circulation of the air, I closed the entrance of both, that the bees, seeking for their queen, should not find her. In two hours they calmed, and order was restored, and we afterwards saw the commencement of three royal cells.

"The apertures in the division between the halves allowed the communication of the bees of No. 1, with a queen produced from these, by means of smelling and hearing. They were separated by an interval not exceeding the *third* or *fourth* part of an inch, which they could not pass; yet the same bees became agitated; they constructed royal cells, and reared young queens, as if their queen had been quite lost. This observation proves that it was neither from sight, hearing, nor smell, that the bees were sensible of the presence of their queen, and that the aid of another sense was interposed. The division inserted between the halves of the hive having deprived them of nothing but contact with her, was it not very probable that her presence had to be learned by touching her with their antennæ? It is by means of these organs that bees gain the knowledge of their combs, their young, their companions, and also of their queen; all communicated by the sense of feeling.

"To be satisfied on this point, a queen was confined in a glass box, covered within with a grating, which allowed the passage of the antennæ, but was too small for the heads of the bees. We remarked from the first, that the distress commonly following the departure of a queen was not manifested on this occasion. All the bees knew that she was not lost, and when she was restored to them, they seemed to recognise her immediately. The communications of the bees with this queen were made by means of an infinite number of antennæ thrust through the grating, and turning in all directions, plainly indicating that they were occupied with her. She acknowledged the interest they took in her, by always remaining fixed on the grating, and crossing her antennæ with those so evidently employed in ascertaining her presence."

The palpi or feelers are usually few in number. These organs are small, and generally cylindrical, consisting of from one to six joints, one palpus being implanted in each of the two lower jaws, and the remaining two being attached to the lower lip. The former, or upper pairs, are, in most cases, a joint longer than the under; so as that they may all four, when bent down, reach to the ground at the same time. They are most commonly smooth, and end in a softish point; but in some cases they are covered with hairs. Some have supposed that they are organs of smell and taste; but the most early idea, and that from which they derive their present name, is, that they are organs of active touch; and this seems to be the most correct and probable opinion. Cuvier, himself a host, has embraced this side of the question. The palpi of numerous insects, when they walk, are frequently, or rather without intermission, applied to the surface on which they are moving: this may be easily seen by placing one on the hand; which seems to indicate that they are feelers. In the scorpimidæ they answer the purpose of hands; besides, being usually much shorter than antennæ, they are better calculated to assist an insect in threading the dark and tortuous labyrinths through which it has often to grope its way, and where antennæ cannot be employed. "I have noticed," says an eminent naturalist, "that hydrophili, in which genus the palpi are longer than the antennæ, when they swim, have their antennæ folded, while the palpi are stretched out in front, as exploring before them. As the palpi are attached to the under-jaws and under-lip, we may suppose they are particularly useful to insects in taking their food; and, upon this occasion, I have often observed that they are remarkably active. I have seen *byturus tomentosus*, a beetle which feeds upon pollen, employ them in opening anthers; and the maxillary pair appear to me to assist the maxillæ in holding the food, while the mandibles are at work upon it."

The arms or fore-legs of some insects are also organs of active touch, being used for various purposes. By the ephemeræ, which have very short antennæ, the fore-legs, when they fly, are extended before the head, parallel with each other and quite united; probably to assist in cutting the air. The trichoptera use their antennæ for the same purpose. Other parts seem to have something to do with the sense we are now considering. The eyes of spiders must be used in planning their frame-works; but they cannot be guided by them in the details, for the spinneret, whence they draw their threads, being situated behind, they must depend, in a great measure, on the tact of this organ for the accuracy of their workmanship. The soft yielding consistency and the papillary form of this wonderful organ, indeed, seem to indicate its being well adapted for an instrument of touch. But the claws themselves must also have this sense in perfection; for in making the various rays as well as the cross lines of a geometric net, the spider always guides the thread from the spinneret by one of its hind-claws, which it cannot possibly see with any one of its eyes, as these are all placed forwards on the head. The exquisite structure of these webs, thus woven as it were in the dark, shows that the sense of touch by which alone it can be accomplished, must be peculiarly delicate.

Insects are peculiarly sensible to electric changes in the atmosphere. Kirby and Spence tell us, that "when the atmosphere is in a highly electrified state, and a tempest is approaching, insects are usually most abundant in the air, especially towards the evening; and many species may then be taken which are not at other times to be met with: but before the storm comes on, all disappear, and you will scarcely see a single individual upon the wing." They conjecture, that the organs destined for perceiving these electric changes are the antennæ, particularly those furnished with a lateral bristle, and the plumose and pectinated ones, from this form seeming to be calculated to act on the electricity and moisture of the atmosphere, "which, in certain states and proportions, may certainly indicate the approach of a tempest, or of showers, or a rainy season, and may so affect these organs as to enable the insect to make a sure prognostic of any approaching change; and we know no other organ that is so likely to have this power."

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## SCRIPTURE EXPLANATIONS. NO. XXVII.

"Thou shalt not plant thee a grove of any trees near unto the altar of the Lord thy God, which thou shalt make thee."—Deut. xvi. 21.

The heathen temples in India are almost always placed within groves, unless they are in towns, and then they are surrounded by high and thick walls. This was the practice in ancient Canaan. The reason for placing these resorts of idolatrous worship amidst secluded places, surrounded by almost impenetrable woods, is not easy to be imagined, unless it was to afford an opportunity for the performance of those horrid rites with which paganism abounds in every part of the world. The religion of every dark and barbarous people is, more or less, bound up with cruel and infamous rites, which even the barbarians themselves feel reluctant to exhibit before the light of day. Human sacrifices offered to idols are forbidden by the East India Company's regulations, yet instances are occurring frequently of persons being offered in sacrifices to different idols; and especially in those parts of India which are not under the immediate control of government. Connected with idolatry are those scenes which the apostle so emphatically calls "the unfruitful works of darkness." "For it is a shame to speak of those things done of them in secret." Hence the Jews were forbidden to build their altars near a grove, but in the most public places, that all might witness the solemnities of the true worship, that every temptation to those pollutions, induced by our corrupt nature, assisted by darkness and secresy, might be effectually excluded. O Lord, thou art light, and in thee there is no darkness at all.—*W. Brown.*

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## GAS.

The mode of preparation of gas is as follows: large, tight iron vessels, three quarters filled with bituminous coal, are heated in furnaces to a red heat; to the end or open mouth of the vessels containing the coal are tightly fitted iron tubes, which convey the substances (gas, water, ammonia, and tar) produced by the combustion of the coal to reservoirs, in which they become separated, the tar and water being condensed, while the gas passes on to other vessels, in which the preparation is completed. It is passed through pure water, and through lime-water, by which it is cleansed of its impurities, into the gasometer, in which it remains till wanted for use. This instrument consists of two parts; a large wooden or iron cistern, open above, partly filled with water, and a large open vessel of iron, or some other substance, which is inverted in the water contained in the other, and is suspended and balanced by weights playing over pulleys. Then, as the gas enters at the bottom of the cistern, it rises up into, and thus pushes up, the inverted vessel, or gas-holder, till it is filled. From this it is let out through tubes, provided with stop-cocks. As soon as the cocks are opened, the weight of the gas-holder, tending to sink it in the water, forces out the gas it contains. It is then transmitted through small iron or leaden pipes to the place where it is needed. On an average, a chaldron of good Newcastle coal, weighing about twenty-five hundred weight, will afford eleven thousand cubic feet of gas, each foot of which is equivalent, in burning, to the light of a mould candle of six to the pound, during the same space of time: hence, one pound weight of coal will afford light equal to such a candle for four hours and a half.

The residue of coal, after the gas, tar, &c. are distilled from it, is coke. Yet, although the employment of coal-gas for lighting is a discovery of our times, coke was manufactured upwards of two centuries since, when the gas, &c., were probably lost in the process. Coke is said to have been invented in 1627 by John Hacket and Octavian Strada. Evelyn calls it a new project of Sir John Winter. In a newspaper about the middle of the seventeenth century, is the following advertisement: "There is a sort of fewel made by charking or calcining Newcastle coals, which burns without smoak, without fouling the furniture; and altogether as sweet, and is much more lasting and profitable than wood or charcoal. It kindles suddenly, and is useful either for chambers, roasting of meat, drying of malt or hops, wooll-coming, distilling, preserving, or any such like employment.

His highnes the lord protector (Cromwell) with the advice of his council, has encouraged and authorized the making thereof, in order to the preservation of the woods of the nation." Coke is now principally used in iron smelting; steam-engines also consume a vast quantity annually, and by its substitution for coal as fuel in a steam-carriage, the nuisance of smoke is prevented. Thus, coal now yields gas for lighting, coke for heat, tar for many useful purposes, (as preserving fences and outbuildings,) and a liquor which is converted into sal ammoniac, an important substance in chemistry, and of useful application in certain branches of domestic economy, as the fermenting of bread and biscuits. Sal Ammoniac is used by gingerbread bakers in large quantities; it ferments, or renders the mass light.

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## BOTANY.—No. IX.

### PRIMULACEÆ.

The flower, which is taken as the pattern for all the other members of this order, is, perhaps, of all others, not even the rose excepted, the most familiar, namely, the primrose. The leading characters which make up our notion of the primulaceæ are derived from the regularity of the corolla, and the particular nature of the seed-vessel. This seed-vessel generally appears like a little ball, neatly rounded, and of a smooth and delicate texture. It is without partitions, and the seeds are borne upon a central column. If the calyx or cup of a primrose be examined after the fall of the corolla, a round polished capsule will be seen in its centre; if a cut be then adroitly made round it, so as to divide the case, without disturbing any thing it contains, a little central column will be exposed to view, bearing a crowded knot of seeds. The curious reader will then have under his observation one of the distinguishing marks of this family.

The calyx is generally divided into five teeth, never down so far as to appear in distinct leaves. Corolla regular, with five equal tubes, bearing the stamens, each in a line with the clefts, that is, just opposite to the middle of the teeth of the calyx. Stamens uniformly five. Style single. Stigma seldom divided; sometimes in a head or ball, as in the primrose. The stems of plants belonging to this order are always herbaceous. If the student is desirous of exemplifying what is meant by pentardria, or five stamens, when found in one flower, and monogynia or one style, the well-known plants of this order will afford him easy opportunities of doing it.

EXAMPLES.

*Primula.*—Flowers generally in an umblet, with an involucre. For a definition of these terms, see Umbelliferæ.

Corolla, with a cylindrical or pipe-shaped tube, and a spreading border. If we gently rend this tube, the five little stamens are seen originating from the substance of the corolla. The next object is a little ball or stigma placed upon the top of a delicate thread or style, and at the bottom a small globular seed-vessel.

*P. Vulgaris*, common primrose.—Leaves toothed and wrinkled. The flower-stalk rises apparently from the root, whence it has been technically called a scape. Flowers are in the primrose commonly unconnected with each other, yet a variety has been found resembling the common primrose in all respects, except that it had its flowers in an umblet, that is, having several blossoms upon the same flower-stalk, which blossoms proceeded from a single point in that flowering stalk. It would appear, therefore, that the common mode of producing one solitary flower from the same peduncle or flower-stalk, was a deviation from the regular way.

*P. Elatior*, oxlip.—Differs from the primrose chiefly in having several flowers growing in an umblet upon the same scape or flower-stalk. Found in woods.

*P. Vevis*, cowslip.—The cowslip differs from the preceding species in having its corollas with a concave limb, instead of being flat.

*P. Farinosa*, bird's-eye.—Leaves smooth; in which particular it differs from all the rest. Border of the corolla flat. Blossoms rose-coloured, in umblets. In marshy mountains.

*Hottonia.*—Corolla cup-shaped, stamens standing on the margin or edge of the tube of the corolla.

*H. Palustris*, water violet.—Flower-stalks in whorls, numerous, and of a flesh-colour. The leaves are toothed like a comb, and remain beneath the surface of the water. In ditches and ponds; flowering in June and July.

*Lysimachia.*—Corolla wheel-shaped, that is, without a tube, and having its divisions flat and horizontal. Capsule globular, pointed, with five or ten valves or folding pieces.

*L. Vulgaris*, yellow loose-strife.—An elegant ornament of watery places, where shade abounds, along the reedy banks of streams. In these situations it is found growing among the common Valerian and the purple spiked willow-herb; but it is not so common as they are. Stem is three feet high, terminated by a beautiful cluster of yellow flowers. The leaves are lance-shaped, and placed by fours in a whorl. The clusters of flowers rise from the bosom of the leaves at the top; each partial or lesser flower-stalk is furnished with a little coloured leaf, which is usually called a bracte, at its base. If the stamens be examined, they will be found to have their filaments united at their base.

*L. Nummularia,* moneywort.—Leaves somewhat heart-shaped. This pretty unaffected plant is found among the grass and other herbage in moist meadows, and is readily distinguished by its pale green leaves, creeping stem, and its solitary flowers, which are of a bright yellow.

*Anagallis.*—Corolla wheel-shaped, that is, without any tube, as in the primrose, and having its segments flat and directed as from a centre like the spokes of a wheel. The essential characteristic, in conjunction with the wheel-shaped corolla, is in the seed-vessel, which parts horizontally, so that one half resembles the lid, the other the bottom of a box. In this way it is opened for the discharge of the seeds, which, before they are ripe, adhere to a central column, as described in our general outline of this order.

*A. Arvensis,* pimpernell, or poor man's weather-glass.—This pretty little plant is extremely common in corn-fields, flowering from May to September; it may be distinguished by its smooth, egg-shaped leaves, and small scarlet flowers, with a purple centre. If the under sides of the leaves be examined, a number of minute impressed dots will be discovered. It has obtained the name of poor man's weather-glass from the disposition which the blossoms exhibit to close up at the approach of rain. In cloudy weather, we have often seen the blossoms shut, which may be explained by recollecting that the expansion of a blossom is owing to the stimulus of heat; if then the effect of this stimulus be counteracted by the presence of moisture, it will close, supposing that its elasticity has not been destroyed. There is a variety of the pimpernell with blue flowers, found also in corn-fields. This is, by Sir James Smith, made a distinct species, under the name of *A. Cærulea,* and distinguished from the former not only in its blue flowers, but in the upright nature of the stem, and its toothed corolla.

*A. Tenella,* bog pimpernell.—Leaves egg-shaped, or nearly round, rather sharp. Stem creeping. Flowers rose-colour, nearly bell-shaped. Found in boggy places, flowering in August and September

In a summer's walk into the fields, we may look for the poor man's weather-glass in every cultivated piece, and recognise it by the red dye of its flowers. If we come to a spot that is moist and grassy, especially in the shade of a wood, we may look about in expectation of finding the moneywort, known by its bright yellow flower; and if we approach a stream of water, there are hopes of meeting with the water-violet, which we distinguish by its flesh-coloured blossoms, and its leaves, which are cut like the teeth of a comb. If we are successful in finding the last, we may return home with our gains, examine each blossom carefully by itself, and then compare it with the rest; and we shall then have reason to admire that wisdom which has joined so many plants together by so many points of mutual agreement, that at first sight seemed not to have the slightest relationship to each other. By such a walk, recreation will be obtained for the body, relief to the mind, and a portion of solid botanical knowledge for the understanding: and, what makes this knowledge valuable, we are enabled by it to trace, with greater certainty and comprehensiveness, the wisdom and beneficence of that gracious Being who bestows appropriate favours on each little plant, yet links them together into families by many harmonious tokens of relationship; thus reminding us while we ought to be thankful for our peculiar gifts, we are nevertheless brethren, and should neither quarrel with nor envy each other.

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## OMNIPOTENCE AND LOVE OF GOD, AS DISPLAYED IN THE GOSPEL.

The omnipotence of God, which Job was instructed to discover in natural creation, we may see yet more distinctly in the manifestations of the gospel. What but omnipotence can break the hard heart, and turn the lion into the lamb? What but that can lead you, so weak a creature, through hosts of spiritual foes, conquering and to conquer? What inferior power could have originally established the church of Christ amid such fierce opposition? What else has preserved it till this day, so that the gates of hell have never yet prevailed against it? In every accession to that church, by the true conversion to God of another sinner, there is a fresh manifestation of the almighty power of God. Man loves sin so dearly, hates holiness so heartily, and is so chained down to the world and vanity, that Omnipotence alone can effectually turn him to God, and holiness, and truth. "We are his workmanship, created in Christ Jesus, unto good works," Eph. ii. 10. And what a delightful view of the goodness, mercy, and compassion of God have we exhibited in the gospel of Jesus Christ! Job was sent to learn something of the beauty and glory of God, from the peacock spreading his rainbow-wings to the sun. You may learn the same lesson far better in the mild lustre, the holy beauty, the lovely harmony of the Divine perfections, as seen in Him, who is the brightness of his Father's glory, and the express image of his person, Heb. i. 3. I said—indeed, I retract not the assertion—that the eye of faith may read, "God is infinitely holy!" in the cross of Christ; yet sure I am, that the eye of gratitude may read, if tears permit, "God is love!" as that sentiment shines forth, in characters of grace, from the same cross. Was it not love,—christians, let me appeal to your best feelings,—was it not pity, mercy, love, unparalleled, for God, against whom you had so sinned, to give his well-beloved Son to suffer, bleed, and die, for such as you; the Just for the unjust, the sinless for the sinful, the pure, holy, obedient child Jesus for the impure, polluted, disobedient rebel?—*Hambleton.*

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### AFFLICTION.

THE late Rev. Joseph Hughes remarked,—"My short residence in London was rendered very pleasant by the cordiality of my friends.—No human enjoyments, however, are unmixed: while others might, in the kindness of their hearts, congratulate my felicity, a multitude of anxieties poured in upon my mind from expected and unexpected quarters; and, if they did not quite overwhelm me, they at least prevented me from suffering that which was joyous in my lot to lift me up above measure. This is the peculiar way in which affliction (the little I have encountered) has operated for my good. It has always been sent seasonably, just when my vain heart was singing a requiem to its cares, and in danger of removing from *religion* to as great a distance as it is from *distress.* Sorrow humbles the mind and forces reflection. You know I mean *sanctified* sorrow, for there is a sorrow which leaves the soul (just as soap and nitre leave the Ethiopian) in the condition in which it found it.

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### THE BIBLE.

WE are convinced, by the history of ages, and the present state of countries where they are without hope and without God in the world, that the Sun of Righteousness alone could resuscitate the torpid and benumbed faculties of mankind. We know that from Revelation mind has derived its strength, science its utility, and the arts their refinement. From the Bible the astronomer has moralized his demonstrations, and the geologist borrowed his clue and solutions. Nay, it is from heaven the poet and the orator have received models of their respective arts, and all that is sublime, venerable, or pathetic in the production of human genius have been durable only as they embodied the spirit and genius of those perfect prototypes.

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**KNOWLEDGE OF SIN.**—When any person comes practically to know how great a thing it is for an apostate sinner to obtain a remission of sins, and an inheritance among them that are sanctified, endless objections, through the power of unbelief, will arise unto his disquietment. Wherefore that which is principally suited to give him rest, peace, and satisfaction, and without which nothing else can do so, is the due consideration of, and the acting faith upon that infinite effect of Divine wisdom and goodness in the constitution of the person of Christ. This, at first view, will reduce the mind unto that conclusion, "If thou canst believe, all things are possible." For what end cannot be effected hereby? what end cannot be accomplished that was designed in it? Is any thing too hard for God? Did God ever do any thing like this, or make use of any such means for any other end whatever? Against this no objection can arise. On this consideration of him, faith apprehends Christ to be, as indeed he is, the power of God and the wisdom of God unto the salvation of them that do believe, and therein doth it find rest with peace, Mic. vi. 6—8; Dan. xi. 24.—*Owen.*

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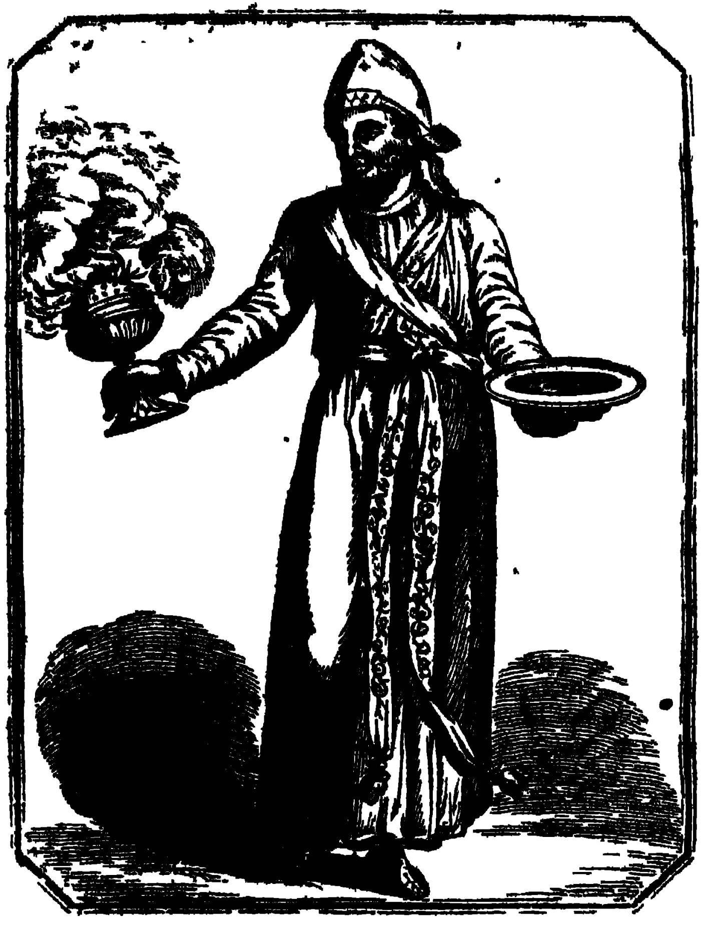

THE HIGH PRIEST ON THE DAY OF EXPIATION.

In No. XLIX. we gave a drawing of the High Priest in his robes: the above sketch exhibits him in a white dress. The cap of the above figure resembles the Phrygian bonnet; and the golden plate in the left hand is flat. The censer in the right hand is taken from medals supposed to be ancient Hebrew, though the best judges dispute their authority; for only those which have Samaritan descriptions on them are reputed authentic, and on such medals this censer has not yet been found.

The great day of expiation was the tenth of Tizri, which answers to our September. On that day, the high priest, after he had washed not only his hands and his feet, as usual in common sacrifices, but his whole body, dressed himself in plain linen like the other priests, wearing neither his purple robe, nor the ephod, nor the pectoral, because he was to expiate his own, together with the people's sins. He first offered a bullock and a ram for his own sins, and the sins of his house; afterwards he received from the princes of the people two goats as a sin-offering, and a ram for a burnt-offering, to be offered in the name of the whole nation

### HINDOO IDEAS OF ECLIPSES.

The Rev. C. B. Lepoult, of Benares, writes:—

On December 26, 1833, there was an eclipse of the moon. Thousands of people came, from all directions, to Benares, to bathe in the Ganges, and to give alms to the brahmins. My boys also asked for liberty; which, being assured that none would come to school, I was obliged to give. The next day I went to school; and having heard them read a chapter, the boys begged permission to ask a question.

"Well," I said, "what is it?"

"An explanation," replied they, "of the true causes of an eclipse."

"You should know them," I said.

"Yes," they answered, "we know two; yours and ours; but which is the true one, we do not know."

I asked them, "What do you suppose them to be?"

They answered, "You know that the brahmins and our shasters say, that Rah swallows the moon up."

"And do you really believe that?" I asked.

Some were silent; others said, "No:" and once more repeated their question what I thought the true causes might be. I began to explain them; and showed, by an experiment, how an eclipse comes to pass. They all admitted that my explanation of what caused an eclipse was much more reasonable than theirs, and were very sorry to be so deceived by their brahmins and shasters. The story of Rah's swallowing the moon, alluded to by the boys, was repeated to me by a brahmin, and is as follows:—When Vishnu churned the sea, fourteen Ratan (previous things) came out; one of them was Madera, (wine) another Amrit (immortality.) Vishnu being desirous to give the Madera to the Rakshas, (dæmons,) and Amrit to the Deotas, (gods,) caused the Deotas to sit on one side, and Rakshas on the other; and having distributed the Madera among the Rakshas, and made them drunken, he began to give the Amrit to the Deotas. One Raksha, however, whose name was Rah, having perceived what Vishnu was going to do, took the form of a Deota upon him, and sat among them. Vishnu, mistaking him for a Deota, gave him Amrit. But Chandermah, (moon,) and Surgj, (sun,) seeing what Vishnu was doing, cried out, "Heh, Vishnu! what are you doing? this is a Raksha." Hearing this, Vishnu at once knew him; and having his chakkar moderrhan (a kind of weapon) in his hand, cut off his head; but it was now too late. Rah, having drunk Amrit, was immortal; and now, being enraged at the sun and moon, as the principal causes of his misfortune, he haunts them through the sky; and whenever he can get them, he will lay hold of them. Sometimes he can get only a part of the moon, and then a partial eclipse takes place; but sometimes, coming just in front of the moon, he swallows her up, and then a total eclipse is caused. When he happens to get the moon so between his teeth as to be able to swallow her up, the people in the moon, while she is passing through his terrible mouth and neck, have very much to suffer, as may be imagined. But if the people on earth, at the time of an eclipse, bathe in the Ganges, especially at Benares, and give alms to the brahmins, (this probably being the most meritorious,) they not only obtain thereby remission of all their sins, but also obtain very effectual means of alleviating the really pitiful state of the poor people in the moon. This story, unreasonable as it may appear to us, is most heartily believed by thousands, even of the pundits.

The day after this, the teacher of the hindoo class, a man who is convinced of the truth of christianity, and most gladly would avow and confess Christ had he not so much to hazard, put the same question to me respecting the cause of an eclipse. I asked his opinion; and he repeated the story I have just related. I told him plainly that he was mistaken; and explained to him the true causes. He, having heard my explanation, replied, "Then are our shasters mistaken in this point?"

I said, "Yes; and not only in this, but altogether."

He was silent for a while; and then repeated an old question, namely, "What is the state of a man who sees the beauties and suitableness of christianity; who believes in one God, but is not entirely convinced that there is only *one* way of obtaining salvation?' I showed him that it was easy for a sincere mind to ascertain this point, it being plainly revealed in the holy Scriptures; and added, that many alleged, as the cause of their unbelief, their not being fully convinced; while it was, in fact, nothing but either a fear of man or the love of sin, both being inconsistent with a believer in Christ. With this man I had many an interesting conversation. I hope that the Lord will continue the work which He has, I humbly trust, begun in him.

## CHEMISTRY.—No. XV.

### ACIDS.—NO. II.

**Phosphoric Acid** is a compound of oxygen and phosphorus, in the proportion of 20 parts of oxygen, to 15 71 of phosphorus. It was formerly produced by burning phosphorus in oxygen gas, but it is now chiefly obtained from animal bones. When pure, it is formed in white and snowy flakes; but when exposed to the air, it attracts the aqueous vapour, and becomes a dense fluid. The phosphorus acid contains a smaller proportion of oxygen than the phosphoric, and may be produced by the slow combustion of phosphorus in oxygen gas. These acids have not been applied to any important use.

**Muriatic Acid** is obtained from sea salt, and is a combination of chlorine and hydrogen. It has a yellowish colour, and emits white fumes of a disagreeable and suffocating smell. It is one of the most corrosive of all the acids, and has a very strong affinity for water and silver. It is generally employed as a test for silver, and however small may be the quantity of silver held in solution, it will be instantly detected by a drop of muriatic acid. This acid is extensively used in the arts, and it may be worthy of notice, that in a diluted state it may be employed for removing ink stains from books without affecting the print.

**Fluoric Acid** is a compound of fluorine and hydrogen, and is obtained from a mineral substance called fluor-spar. Its smell has a great resemblance to that of muriatic acid. A remarkable and distinctive property of this acid is its power of corroding silica, and thus destroying the transparency of glass, and it is consequently used for etching on this substance.

**Boracic Acid** is composed of boron and oxygen, in the proportion of one part of the former to two parts of the latter. The taste of this acid is at first sour, then bitter, and at last it leaves a sweet flavour on the palate. When united with sulphuric acid, it emits a smell greatly resembling musk. It is obtained in the form of thin scales, and combines with the alkalies, and with some of the earths and metallic oxides. It gives to turmeric paper a brown colour, similar to that produced by the alkalies, but it reddens litmus paper, and gives a green colour to flame.

**Arsenic Acid** was discovered by Scheele, and consists of arsenic and oxygen. It is a white heavy substance, obtained by dissolving common white arsenic (arsenious acid) in concentric nitric acid, with a small quantity of muriatic, and distilling the solution to dryness. It is a remarkably active poison.

**Tungstic Acid**, a compound of tungsten and oxygen, is a tasteless yellow powder, insoluble in water, and is found native in a mineral called wolfram. It dissolves several of the metals.

**Molybdic, Chromic, and Telluric Acids**, are composed of molybdenum, chromium, and tellurium with oxygen, and belong to the class of acids we have been examining; but they do not possess any useful properties, and need not therefore be described.

The acids belonging to the second class are chiefly of vegetable origin, and contain more than two elementary substances, which are commonly oxygen, hydrogen, and carbon, and occasionally a portion of nitrogen.

When saccharine liquors have passed from the first or vinous fermentation to the second or acetous fermentation, an acid may be obtained from them, called the acetic acid. Vinegar is a diluted acetic acid, but when pure and concentrated it is colourless, has a pungent and acrid taste, and is of a volatile and corrosive nature. Pyroligneous acid is a substance possessed of the same properties, and is produced by the destructive distillation of vegetable matter. It is, however, extremely impure, being combined with tar, and a nauseous empyreumatic vegetable oil, though it may be purified and used as a substitute for vinegar. Pure acetic acid consists of twenty-four parts of carbon, twenty-four of oxygen, and three of hydrogen.

**Oxalic Acid** is composed of twenty-four parts of oxygen with twelve of carbon, and is found in the juice of sorrel and in the roots of rhubarb. It may also be obtained from sugar, and has hence been sometimes called acid of sugar. It is an extremely active poison, and produces almost instantaneous death. It is extensively used by calico-printers, and is often employed to detect the presence of lime, for which substance it has a greater affinity than any other acid. If a few drops of the solution of oxalic acid be dropped into a neutral solution of muriate of lime, a precipitate will be immediately formed, which is the oxalate of lime. But it is always necessary that there should not be an excess of muriatic acid, for the lime would then be re-dissolved. If a person has taken oxalic acid into the stomach, powdered chalk, or magnesia in water, should be immediately administered in large doses, and the operation of the poison may thus be generally prevented.

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### NEGROES AND PEOPLE OF COLOUR.

A LETTER dated, some months ago, Ann Harbour, Michigan, from Mr. Metzgar, a Lutheran clergyman, gives an account of the disrespectful conduct of the Americans towards Mrs. Metzgar, simply because the colour of her skin was less fair than their eye had been accustomed to. The perusal of this drew my attention to a statement made by Sir Everard Home, some years ago, on the utility of the black substance in the skin of the negro, in preventing the scorching operation of the sun's rays; and as we know that nothing tends more to the removal of prejudice, than the rectification of the judgment upon those points upon which it may have been warped by false impressions, it is possible that some might be induced to look with respect and benevolence upon those they have hitherto slighted, when they consider that the very colour which has awakened contrary dispositions, is an indication of the peculiar care of our heavenly Father over this portion of our fellow-creatures.

Some time ago, Sir Everard Home, at a meeting of the Royal Society, showed that by exposing the back of the hand or other parts of the body to the sun's rays, they become irritated and inflamed; small specks or freckles first appear, and these on continual exposure rise into blisters. The same is true, if the flesh be covered with thin white linen; but if the body be covered with a piece of black crape, though it will be hotter when exposed to the sun, yet the rays will no longer produce blisters Thus the injurious effect of the heat of the sun may be prevented by an artificial blackening of the skin. How strongly does this show that the black man, though too often contemptuously treated by his fellow creatures, is not beneath the notice of his Creator; rather may we consider him as continually carrying about with him, in the colour of his skin, the memento of his heavenly Father's mercy.

The depressed and degrading circumstances to which negroes and people of colour have hitherto been subjected, have been very unfavourable to the developement of their moral and intellectual character; but many instances of talent and piety have appeared, notwithstanding these disadvantages, which are sufficient to raise expectation for the future, and to remove every idea of their natural inferiority to the white man.

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### INSECTS.—No. XXXIX.

#### (*Taste.*)

TASTE is absolutely necessary to the continuance of animal existence. In cattle, and animals which feed on green herbs, the tongue is both large and studded with large papillæ or tasters, abundantly moistened with saliva, and also with a peculiar mucus. In herbivorous animals this arrangement is peculiarly necessary, for the variety of herbs is so great, and they often grow so promiscuously together, that had not cattle a great acuteness of taste, they might soon be poisoned. This, however, very rarely happens.

The tongue of insects lies between the two lips, the labrum and labium. On its upper side, at the base, it meets the palate or roof of the mouth, below which it is attached, it may be presumed, by its roots to the crust of the head, on each side the pharynx or swallow; and on its lower side, in many cases, it is attached to the labium, and that very closely, so as to appear to be merely a part of it, and to form its extremity; but in others it is more free, and in form somewhat resembling the tongue of quadrupeds. "When ants are disposed to drink," says M. P. Huber, "there comes out from between their lower jaws, which are much shorter than the upper, a minute, conical, fleshy, yellowish process, which performs the office of a tongue, being pushed out and drawn in alternately: it appears to proceed from the lower lip. This lip has the power of moving itself forwards in conjunction with the lower jaws: and when the insect wishes to lap, all this apparatus moves forward; so that the tongue, which is very short, does not require to lengthen itself much to reach the liquid." What a curious structure to meet the necessities and comfort of these little creatures!

Insects, it seems, are even nicer than cattle in their selection of food, and consequently in the acuteness of their taste. The caterpillar of the antler moth, (*charæas graminis,*) though it feeds on a variety of grasses, and sometimes ravages to so great an extent the meadows of Sweden, as to endanger the lives of the cattle for want of food, does not touch the fox-tail grass, though to us its leaves taste little, if at all different from some of those it so greedily devours. Other creatures confine themselves to only one species of grass.

The bee-mite, though not very easily dislodged while the bee is alive, scampers off as soon as the bee dies, and even long before, when it becomes sickly from the irritation of the numbers by which it is infested. Whether this arises from their finding it more difficult to penetrate the skin, or from their not relishing the diseased fluids, we cannot tell; but the latter is the more probable reason, from the singular fact, that fleas and other parasitic insects never infest a person who is near death; a fact that has been so frequently observed, that it has become one of the popular signs of approaching dissolution.

"Perhaps," says the elder Huber, "the sense of taste is the least perfect of those enjoyed by bees; for, contrary to the received opinion, they display little choice in collecting honey; nor do they testify greater nicety in the quality of their water, for the most corrupted marshes and ditches seem to be preferred to the most limpid streams, nay, even to dew itself. Nothing, therefore, is more unequal than the quality of honey, the produce of one district differing from another, and the honey of spring being unlike that of autumn; while even the contents of one hive do not always resemble those of the one which is contiguous. But though bees are thus not very choice in their nutriment, and are by no means delicate in regard to the quality of honey, they are far from being indifferent with regard to the quantity. They soon discover, and consequently frequent, the places where most is to be found; and they quit their hive much less in regard to the fineness or temperature of the weather, than according to their prospect of a plentiful or a scanty collection. When the lime-tree and blackthorn blossom, they brave the rain, departing before sun-rise, and returning later than ordinary; but this activity soon relaxes; when the flowers begin to fade, and when the scythe has cut down the fields of clover, the bees are seldom tempted to go from their home by the most brilliant sunshine."

Man possesses salivary fountains for moistening his organs of taste, and an analogous structure is discoverable in insects. Thus a fly contrives to suck up through its narrow haustellum a bit of dry lump-sugar; and for this it seems unprepared, as the small crystals are not only unfitted to pass, from their angular form, but adhere too closely together to be separated by any force the insect can exert. But when some sugar has been placed on the outside of a window, while observation has been carried forward through a magnifying glass in the inside, it has been seen that the fly lets fall a drop of fluid occasionally on the sugar, in order to melt it, and thereby render it fit to be sucked up, just as we moisten a mouthful of dry bread with saliva, to fit it for being swallowed.

Vessels which supply the saliva in more than one species of insects, seem to have been first observed by Swammerdam, in the small tortoise-shell butterfly, *vanessa urticæ;* but as he could not trace their termination, he says, with his usual scrupulous caution, "what the office of these vessels is, and whether they may not be the salivary ducts, I cannot take upon me to determine." Lyonnet afterwards discovered a conspicuous pair of these vessels in the caterpillar of the goat-moth, (*cossus ligniperda,*) distinct from the silk reservoirs, with which Swammerdam was inclined to confound them, and their existence has been placed beyond all doubt by Ramdohr, to whom we are indebted for the following interesting facts.

"The pipes which carry the saliva do not always open into the mouth, but sometimes into the gullet, as in a sort of bug, (*pentatima,*) and sometimes into the stomach itself, as in the bee-flies. It is remarkable that the latter insects, from feeding exclusively on the nectar of flowers, do not require a supply of saliva to moisten their food in the first instance, though it appears to be indispensable to digestion; while in bugs, which feed on vegetable and animal juices, one pipe opens into the sucker, to enable the animal to soften, if necessary, the skin it has to pierce through, and another into the stomach or gullet to aid digestion. In the common fly again, and the gad-fly, both pipes open into the sucker, and we have already seen the ingenious use which is made of this when the insect feeds on dry sugar. In the water-scorpion, there are no fewer than six of these vessels, though it is rare that there are more than two in other insects. It is worthy of remark, that the exterior double pair in it is found, when highly magnified, to consist of little globules resembling a bunch of currants; and a similar structure has also been detected in one of the bee-flies, precisely like what occurs in our own salivary fountains."

Ants are very fond of water. One of them has been seen quaffing a drop of dew almost as large as its whole body; and when those in glass formicaries have water given them, they seem quite insatiable in drinking it; a circumstance well shown in the following anecdote from Huber:

"The feet," he says, "of my artificial formicary (abode of the ants) were plunged in vessels constantly filled with water. This, which was originally adopted to prevent the escape of the inmates, proved to them a fruitful source of enjoyment, by supplying them with a plentiful beverage during the heats of summer. One day, while they were assembled at this fosse of the formicary, occupied in licking up the little drops which filtered between the fibres of the wood, which they preferred to taking it from the basin itself, I amused myself in disturbing them, upon which the greater number ascended; but a few remained, whom my presence had not alarmed, and who continued carousing. One of those, however, who had regained the nest, came back, and approached another, apparently quite absorbed in the pleasure of drinking. It pushed the drinker with its mandibles several times successively, raising and lowering its head alternately, and at length succeeded in driving it off. The officious ant then reached another similarly engaged, with whom it found no less difficulty; at length, being persuaded of the necessity of withdrawing, the drinker passed precipitately to the bell glass. A third, warned in the same manner and by the same ant, quickly regained the nest; but a fourth remained alone at the water's edge, and would not retire, nor pay any attention to the reiterated blows of its friendly monitor, who at length seized it by one of its legs and dragged it away rather roughly. The toper, however, returned, keeping his large mandibles extended with all the appearance of rage, and again stationed himself to quaff the delightful beverage; but its companion would give it no quarter, and, coming in front, it seized it, and dragged it by main force to the nest."

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## PARLIAMENTARY PAPER ON DRUNKENNESS.

**From the Report of the Select Committee of Inquiry on Drunkenness, appointed by the House of Commons.**

THAT in a national point of view, as affecting the wealth, resources, strength, honour, and prosperity of the country, the consequences of intoxication and intemperate habits among the people are as destructive of the general welfare of the community as they are fatal to the happiness of individuals. Among others, the following effects may be distinctly traced:—

The destruction of an immense amount of wholesome and nutritious grain, given by a bountiful Providence for the food of man, which is now converted by distillation into a poison; the highest medical authorities, examined in great numbers before your Committee, being uniform in their testimony that ardent spirits are absolutely poisonous to the human constitution; that in no case whatever are they necessary, or even useful to persons in health; that they are always in every case, and to the smallest extent, deleterious, pernicious, or destructive, according to the proportions in which they may be taken into the system; so that not only is an immense amount of human food destroyed in such a manner as to injure greatly the agricultural producers themselves, for whose grain, but for this perverted and mistaken use of it, there would be more than twice the present demand for the use of the now scanty-fed people, who would then have healthy appetites to consume, and improved means to purchase nutriment for themselves and children, in grain as well as in all other varied productions of the earth.

The loss of productive labour in every department of occupation to the extent of at least one day in six throughout the kingdom, (as testified by witnesses engaged in various manufacturing operations,) by which the national wealth, created as it chiefly is by labour, is retarded or suppressed to the extent of £1,000,000 out of every £6,000,000 that is produced; to say nothing of the constant derangement, imperfection, and destruction in almost every agricultural and manufacturing process, occasioned by the intemperance and consequent unskilfulness, inattention, and neglect of those affected by intoxication, producing great injury to our domestic and foreign trade.

The extensive loss of property by sea from shipwrecks, founderings, fires, and innumerable other accidents, many of which, according to the evidence of the most experienced shipowners, mercantile men, and others, examined by your Committee, are clearly traceable to drunkenness in some of the parties employed in the navigation and charge of such vessels, whose vigilance, had they been sober, would have been sufficient safeguards against their occurrence.

The comparative inefficiency of the navy and army; in both of which, according to the testimony of eminent naval and military offic[illegible]xamined by your Committee, intemperance is a cankerworm that eats away its strength and its discipline to the core; it being proved beyond all question that one-sixth of the effective strength of the navy, and a much greater proportion of the army, is as much destroyed as if the men were slain in battle by that most powerful ally of death, intoxicating drinks; and that the greater number of accidents occurring in both branches of the service, seven-eighths of the sickness, invalidings, and discharges for incapacity, and nine-tenths of all the acts of insubordination, and the fearful punishments and executions to which these give rise, are to be ascribed to drunkenness alone.

That the mere pecuniary loss to the nation from these several causes already enumerated; namely, the destruction of an immense amount of grain subjected to distillation, the abstraction of productive labour from the community, the diminished efficiency of the navy and army, the decrease and deterioration of the physical and mental powers of the population, the increase of pauperism, the spread of crime, and the retardation of improvement, caused by the excessive use of intoxicating drinks, may be fairly estimated at little short of £50,000,000 sterling per annum.

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## THE POST-OFFICE.

The post-office was not established in England till the seventeenth century. Post-masters, indeed, existed in more ancient times; but their business was confined to the furnishing of post-horses to persons who were desirous of travelling expeditiously, and to the despatching of extraordinary packets upon special occasions. In 1635, Charles I. erected a letter-office for England and Scotland; but this extended only to a few of the principal roads, the times of carriage were uncertain, and the post-masters on each road were required to furnish horses for the conveyance of letters at the rate of twopence halfpenny a mile. This plan did not succeed; and, at length, a post-office for the weekly conveyance of letters to all parts of the kingdom was established in 1649; by which plan the public saved several thousand pounds a year on account of post-masters. In 1657, the post-office was established nearly on its present footing, and the rates of postage that were then fixed were continued till the reign of Queen Anne. Mails were, however, down to 1784, conveyed either on horseback or in small carts; and instead of being the most expeditious and safest conveyance, the post had become, at the latter period, one of the slowest and most easily robbed of any in the country. In 1784, the coaches accomplished the journey from London to Bath in seventeen hours, while the post took forty hours. This great disproportion gave rise to the establishment of mail-coaches, and such is their regularity at the present time that a post-office regulation fixes to a minute, and in more than one instance to half a minute, the time at which the mails are to arrive at the several towns and villages on the road.

The number of letters and newspapers conveyed to the British post-office is immense. The letters, only, despatched from London, may, we believe, be estimated to average about forty thousand a day; and the postage sometimes exceeds two thousand five hundred pounds in a single morning: yet so complete are the arrangements at the post-office, that forty-four thousand letters have been sorted and marked by one hundred and five persons in the space of forty-five minutes. There may, in all, be about three thousand persons employed in the carriage and distribution of letters in Great Britain only; besides about one hundred and eighty coaches, and from four thousand to five thousand horses. The sum produced by the postage has, of course, progressively increased since the establishment of the post-office. Thus it was,

| | |
|---|---|
| In 1722 . . . . . | £ 204,804 |
| In 1800 . . . . . | 1,083,950 |
| In 1814 . . . . . | 2,005,987 |

since which year it has varied but little. After all deductions of expenses, the nett profit to government amounts to about one million three hundred and fifty thousand pounds a year.

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## RIPE BREAD

Bread made out of wheat flour, when first taken out of the oven or skillet, is unprepared for the stomach It should go through a change, or ripen before it is eaten. Young persons, or persons in the enjoyment of vigorous health, may eat bread immediately after it is baked, without any sensible injury from it, but weakly and aged persons cannot; and no one can [illegible] between the [illegible] bread, when being, [illegible] as the change [illegible] healthy until [illegible] the change. During the change in bread it sends off a large portion of carbon, or unhealthy gas, and imbibes a large portion of oxygen, or healthy gas. Bread has, according to the computation of the physicians in London, one-fifth more nutriment in it when ripe, than it has when just out of the oven. It not only has more nutriment, but imparts a much greater degree of cheerfulness. He that eats old ripe bread will have a much greater flow of animal spirits than he would if he were to eat unripe bread.

Bread, as before observed, discharges carbon and imbibes oxygen. One thing in connexion with this thought should be particularly noticed by all housewives. It is, to let the bread ripen where it can inhale the oxygen in a pure state. Bread will always taste of the air which surrounds it while ripening; hence it should ripen where the air is pure. It should never ripen in the cellar, nor in a close cupboard, or in a bed-room. The noxious vapours of a cellar or a cupboard never should enter into and form a part of the bread we eat. The writer of this article has often eaten bread of this kind, and has felt strongly disposed to lecture the mistress of the house on the subject of keeping bread in a pure atmosphere. Every man and woman ought to know, that much of health and comfort depends upon the method of preparing their food. Bread should be light, well baked, and properly ripened before it is eaten.—*Nat. Rep.*

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## EDUCATION OF CONVICTS.

[From a Correspondent of the British and Foreign School Society.]

"The state of education amongst these people is extraordinary, for few of them, proportionally speaking, can either read or write. At my farm in Van Dieman's Land, I had an English free overseer and five convict servants, none of whom could write their names. From all my inquiries on the subject, I am convinced that not one-half, perhaps a much smaller number, can read or write. One would expect that the Scotch, at least, would not be included in this remark; but even they did not appear [illegible] to form an exception. Another circumstance will place this interesting subject in a clearer light. The [illegible] who are denominated [illegible] are usually sent to a [illegible] at Wellington, and I believe that [illegible] were [illegible] one hundred. When I visited that place there were but forty, out of whom I had reason to believe there were several who, at no period, had any title to be considered as gentlemen; and, although there were amongst these several who had been officers in the army and navy, few, if any of them could be said to have received a liberal education.

But let us dismiss this last remark from our attention, and consider the forty, or rather the highest number, one hundred, to be all men of education. Also, let us consider, that by some oversight, instead of one hundred, there were four times that amount. What proportion do four hundred educated men bear to the whole convict population, 14,000? The result, therefore, of these inquiries has led me to believe that the common convicts, generally, have obtained less than the average education of the lower class in their respective countries, and therefore, that a clear and direct mode presents itself of decreasing crime in any country, by increasing the education of the lower classes.

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## MORALITY.

Morality is not grace, because it doth not change nature. If it did, many of the heathen were as near to God as the best of christians. Whatever may be done by the strength of nature, cannot alter it, for no nature can change itself. Poison may be great within the skin, like a viper's. But freedom from gross sins argues not a friendship for God. None were ever so great enemies to Christ as the Pharisees, to whom Christ gave no other title than that of the devil's children, and charges them with hatred both of himself and Father, John viii. 44.—*Charnock*

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**Pride.**—There is no vice more insupportable and more universally hated than pride. It is a kind of poison, which corrupts all the good qualities of a man; and whatever merit he may otherwise possess, this single fault is sufficient to render him odious and contemptible; so that by pleasing himself too much, he displeases every one.

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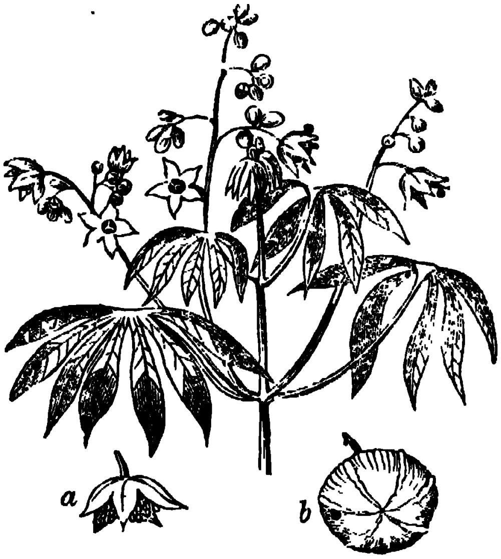
# THE
# WEEKLY VISITOR.

NUMBER CLIV.] TUESDAY, JULY 28, 1835. { PRICE ONE HALFPENNY.



The engraving before us represents a topmost branch of the Jatropha manihot, bitter cassada, or manioc, the root of which yields that well-known article of diet, Tapioca. It is a native of the Brazils, and has been long cultivated in the West Indies, for the sake of the bread that is prepared from it. In French Guiana also, the Cassada flour is in great request, and is made by toasting the grated root over the fire; in which state, if kept from moisture, it will continue good for twenty years. Cassava-cake, or cassava-root, as it is otherwise called, is the meal, or the grated, squeezed, and dried root of the manioc, which, after having been pounded and passed through a sieve, is baked upon flat circular iron plates, fixed in a stone. The process followed in preparing this meal is very similar to that pursued by us in reference to wheat. For the massive root is first reduced by grating; then pressed and dried, which correspond to our reaping, drying, and threshing. When dry, the root we see must be beaten fine in a mortar, and then sifted, to separate the bran from the flour, which answers to the grinding and bolting to which wheat is subjected before it is fit to be made into bread. As to the successive stages of mixing, fermenting, and kneading, there is no resemblance, and the course of preparation ends at once with baking. A quantity of moisture sufficient to bring about a mutual adhesion of the particles is still retained by them, which, through the application of heat, effects a perfect union, so that the flour is removed, when thoroughly baked, in masses, which are called cassava-cakes. These cakes are sold in the markets, and are universally esteemed as a most wholesome and nutritious kind of food. The Spaniards, when they first discovered the West Indies, found cassava in general use among the natives, who called it cazabbi, and by whom it was preferred to every other kind of bread, on account of the ease with which it was digested, the facility of its cultivation, and its prodigious increase. If a person initiated in the principles of systematic botany, and acquainted with the active and most commonly deleterious properties of the euphorbiaceous family, should turn from the wholesome food, just described, to an examination of the living plant which yields it, he would at first be struck at the singular exception, and theory would look blank at the inroad thus unexpectedly made upon the integrity and soundness of her arrangements. After inspecting the first, as represented by fig. *b*, he might say, "I perceive by the seed-vessel that this shrub belongs to a poisonous family; how comes it to pass that instead of a bane, it yields a blessing for the use and behoof of man?" An inquisitive person would not, however, be long at odds with his theory; for he might learn, with a very little inquiry, that, while growing, a most fatal poison had circulated among this nutritious substance, and had only been separated by art and patience in the way described above. Such, indeed, is the poisonous nature of the juice that may be pressed out when the root is fresh, that it has been known to occasion death in a few minutes. By means of it the Indians destroyed many of their Spanish persecutors. A small quantity has been known to destroy dogs and cats, with great agony, within the space of twenty-five minutes. Their stomach, when opened, exhibited no traces of inflammation, nor were their bowels affected, or the blood coagulated: whence it appears that the poison acted solely upon the nervous system; an idea confirmed by the effect which thirty-six drops had afterwards, when administered to a criminal. For these had scarcely reached the stomach, when the poor creature writhed and screamed in the greatest agonies of suffering; these were succeeded by convulsions, in which he expired, within the short period of six minutes. Three hours after death the body was opened, but no alteration had been effected in the appearance of the internal vessels, except the stomach, which, without any marks of inflammation, was shrunk to half its natural size. We infer, therefore, that the volatile substance in which the fatal principle resides, directs its activity solely towards the nervous web that is spread over the whole body, and, in a particular manner, over the coatings of the stomach; which, from its contracted size, plainly demonstrated the nature of that enemy which had wrought upon it after such a terrible sort. Those who prepare the cassava-cake are aware of the pernicious qualities of this juice, and, as we have seen, take the most effectual methods to expel it, by pressing, drying, and baking the pounded root. Vegetable poisons, from their subtile nature, are liable to be completely dissipated by the action of heat. It would seem, in fact, as if their activity and fatal prowess depended upon this liability to vanish at the approach of fire. The leaves of the taro, a native of the South Sea Islands, are poisonous, being akin to our acrid hedge-plant, cookoo-pint, or "lords and ladies;" but, when dressed, they form a most wholesome and nutritious vegetable. Laurel leaves contain a poisonous juice, yet we often see them substituted in sundry kinds of pastry for bay-leaves, and then eaten without producing any ill consequence. For, while baking, the heat dissipated the noxious principle, and left the harmless ones behind.

The intermixture of good and evil is common to all earthly things; it is the proper business of wisdom to separate them—to choose the one, and reject the other. If we had all things ministered to us spontaneously without pains or danger, we should have neither art, science, nor mental sagacity: there would be no practical difference between a wise man and a fool. The most elegant and philosophic of the Latin poets, when rehearsing some of those discouragements which thwart the endeavours of the husbandman, ascribes their existence to the appointment of Heaven, in order to sharpen the attention of man, lest a drowsy lethargy should overspread his powers, and a wanton dulness foil the active instruments of thought. If a heathen could perceive the benefit produced by pain and disappointment, why should we repine because the way to any kind of good is ofttimes puzzled with mazes, and beset with difficulties? The presence of a pernicious mixture in the root of the manioc calls for the exercise of skill, labour, and patience, which the thinking part of mankind agree in esteeming very good things.

We shall conclude by giving a few particulars illustrative of its flowers and fruit. The manioc bears two kinds of flower, one having the ten stamens, which are alternately of different length, fig. *a*, the other a fruit composed of three distinct seed-vessels *b*, which constitute a peculiar characteristic of the euphorbiaceous plants; we mean such as resemble the spurge or wart-wort, which are extremely common, and may be readily known by yielding a milky juice, which our country people apply to their warts. The fruit of the spurge is composed of three grains, as the attentive reader may see with the slightest examination, which will give him a correct notion of the fruit of the manioc. The milky juice is also found in the manioc. In fig. *b*, there appear to be six grains, but this is occasioned by each grain being halved. The size of the manioc is something between a tree and a shrub. The leaves are divided into five or seven narrow leaflets, as represented in our figure.

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### OLD HUMPHREY ON DUELLING.

There are some things so weak and so wicked, so bad and so base, that it is hardly possible to speak of them with temper. Among these may be mentioned the practice of duelling. If there be one custom tolerated by the world that savours of folly, crime, cruelty, and insanity, more than another, it is the custom of duelling.

You may think this rather an odd subject for me to speak upon. It is not a very likely thing that Old Humphrey will ever fight a duel, and I trust it is quite as unlikely that any of his friends will; but for all that, as the words of an old man are sometimes weighty, and as they may possibly reach the ears of some who are interested in the subject, so a word or two about duelling may not be useless.

The custom of duelling consists in this—that persons, for some real or supposed injury, meet each other with deadly weapons, with the deliberate intention of taking each other's lives. Sometimes the weapons used are swords, but more commonly pistols, loaded with ball; the parties usually stand a dozen paces from each other, and fire once, or several times, till their friends, acting the part of seconds, consider the affair honourably disposed of.

Duels, for the most part, are confined to the higher classes, to those who, having had a superior education, are supposed to be wiser and better behaved than other people; to those, in short, whose duty it is to set an example worthy of imitation. And yet I greatly question if there be many customs more absurd and inhuman among the ignorant Hindoos, the untutored Indians, and wild Caffres, of savage life. Absurd and inhuman, however, as it is, there are plenty of people who make for it every apology in their power.

"It certainly is a bad custom," say they, "but we hardly know, if it were done away with, how gentlemen would be able to protect themselves from insult."

And so, because gentlemen find it difficult to put up with insults from their fellow-creatures, they think it well to run the risk of appearing before God in the character of an unrepentant murderer, notwithstanding the tremendous text, "Murderers shall have their part in the lake which burneth with fire and brimstone."

Duelling is an ungodly practice that a heathen might be ashamed of, and Old Humphrey must be excused if he tries to brand it on the forehead.

A lawless libertine leads a young female astray from virtue into the paths of sin, shame, remorse, beggary, and despair, and offers to make reparation by blowing out the brains of her brother or her father. This is duelling.

A free-living gentleman quarrels over the bottle with his most intimate, his dearest friend; hasty words are spoken by both, but neither will acknowledge his error. These intimate acquaintances, these dear friends, meet to give each other satisfaction by sending a bullet through each other's hearts. This is duelling.

Is duelling consistent with justice? No! for justice requires that the guilty should be punished, and the injured be recompensed; but in duelling the offender, the systematic duellist is the most likely to escape, on account of his superior skill in such matters, while the injured party loses his life.

Is duelling consistent with mercy? Mercy! No! The duellist is savagely merciless; for he spares neither foes nor friends. The offence may have been a trifle; but it can only be atoned for with blood. But if duelling have neither mercy nor justice on its side, is it consistent with courage? Courage! No! for true courage takes no unmanly advantage of another, whereas the duellist, who can "split a hair," as the phrase is, with his bullet, is not ashamed (though he surely ought to be) to fight with one who never before pulled a trigger.

"Well," say you, "but it is consistent with the laws of honour." The laws of honour! say rather the laws of sin and Satan; for all the honourables and right honourables that ever yet made the laws of honour their creed, cannot blot out the handwriting of the Holy One that is against them: "Thou shalt do no murder:" for duelling, do with it what you may, and disguise it as you will, is nothing more nor less than deliberate murder.

No man in the world knows better than Old Humphrey how hard it is to subdue a hasty temper; and if he were very severe on this failing in another, he would thereby condemn himself; but in duelling there is time to cool, and this reveals the darkest part of the picture.

It is after retiring for a night's rest; after the evening and morning prayer has been, or ought to have been put up to the Father of mercies, that this merciless deed is committed. You may tell me, if you will, that duellists never pray; but if you do, I shall not think the better of them on that account. They have much to pray for; and one of their prayers should be, "Deliver me from blood-guiltiness, O God!"

Old Humphrey does not like to deal out hard words; he had rather praise than blame; much rather would he treat of peace and mercy than of discord and violence; but he has no soft words for duels and duellers.

Talk of robbers! Old Humphrey would willingly, if he could, make the words tingle in the ears of the most gentlemanly duellist that ever sent a bullet through the bosom of a friend:

> The sturdiest villains, who are wont to stray
> The public roads and pillage all their prey,
> At thoughts of murder tremble with affright,
> And perpetrate the cursed deed by night;
> But thou! more fell, and fiercer far than they,
> Canst rob and murder in the face of day.

Is there any robbery like robbing a wife of a husband? or a family of children of a father? The duellist is a robber! Is there any murder like the murder of an offender, for a word? The duellist is a premeditated murderer.

I was once at an inn, where a military officer, who had taken more wine than he ought to have taken, was quarrelling with all around him. He was a duellist, and the first opportunity that occurred, he gave a challenge. Not a word would he hear of delay; the duel was to take place on the spot; his servant was despatched for pistols, and a brother-officer sent for to act as his second.

With some difficulty this madman was persuaded to put off the duel; and if he had been held under the pump for ten minutes or so, it might have been of some service to his proud and peppery spirit.

Now do not suppose Old Humphrey is ignorant that there are insults difficult to bear; injuries that wring the very heart-strings of a man, wherein all that is in him cries out with a mighty voice against his oppressor. I know this, and I believe that many a virtuous-minded man has been goaded, by the maddening influence of injustice, to fight a duel, persuading himself that, because the law could not redress his wrongs, he was justified in pursuing his oppressor. There is a wide difference between such a one, and the systematic, cold-blooded duellist: but the words are not the words of a man which say, "Vengeance is mine; I will repay, saith the Lord." "No murderer hath eternal life abiding in him."

"It is a fearful thing," says one, "to injure the image of the Almighty, however base may be the metal it is stamped upon." Whatever may be our wrongs, they will not be righted by taking another's life, or rushing with bloody hands into the presence of the Eternal. Let the following text of scripture be engraved on the heart of every man, and then no one will dare to be a duellist—"If ye forgive men their trespasses, your heavenly Father will also forgive you: but if ye forgive not men their trespasses, neither will your Father forgive your trespasses."

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## CHEMISTRY.—No. XVI.

### ACIDS.—NO. III.

**Tartaric Acid** is obtained from a substance known in commerce as the cream of tartar, which is the bitartrate of potash. It has a very acid taste, and dissolves freely in water, and is known to be present in wines, and in a great variety of vegetables and fruits. Calico-printers use it to discharge false prints.

**Citric Acid** was first detected by Scheele in the juice of lemons. It crystallizes in rhomboidal prisms, has a very acid taste, and is soluble in water. It is useful in the arts and in medicine.

**Mallic Acid** is extracted from the juice of apples. It has been sometimes used to separate alumina from magnesia, and has the property of decomposing the muriate of gold, and of precipitating silver and mercury from their solutions in nitric acid.

**Mucous Acid** is obtained by nitric acid from gum arabic, and consists of carbon 33·33; oxygen 61·73; and hydrogen 4·94.

**Gallic Acid** is abstracted from nut-galls, oak bark, and other astringent vegetable substances. "To obtain gallic acid, procure a strong aqueous infusion of nut-galls, and lay it aside where it can remain a considerable time undisturbed, and exposed to the air, in an open vessel. At length, the fluid will be covered with mould, and when this happens, the mouldy part is to be removed, when small yellow crystals will be found attached to the sides of the vessel. These are the gallic acid; and the crystals are to be purified by dissolving them in alcohol, and evaporating the clear alcoholic solution to dryness. As it occurs in nature, this acid is always associated with tannin; the peculiar vegetable principle by which the gelatine of skins is converted into leather, and to which the acid is allied in a manner hitherto unexplained."—*Brayley.*

OXALIC ACID emits an aromatic smell, ignites when heated, and precipitates the oxides of iron.

BENZOIC ACID is obtained from a resin called benzoin, in the form of a white powder. It has an aromatic smell, an acrid and bitter taste, and is soluble in boiling water. According to Mr. Hatchett, it may be obtained by dissolving benzoin, balsam of Tolu, and balsam of Peru in sulphuric acid. During digestion, a beautifully crystallized white benzoic acid is sublimed. This process is recommended by Dr. Thompson.

SUCCINIC ACID is obtained from amber, and is, in itself, useless in the arts, though, when combined with ammonia, it has the property of separating peroxide of iron from its solutions.

CAMPHORIC ACID is derived from camphor, by means of nitric acid; and by the same agent suberic acid is obtained from cork.

LUCCIC ACID is obtained from white lac, a substance brought from the East Indies; and

SEBACCIC ACID from animal fat or tallow.

PRUSSIC or HYDROCYANIC ACID is a compound of hydrogen, nitrogen, and carbon, and is a deadly poison.

URIC ACID is procured, in a crystalline form, from urine; and the

AMNIOTIC ACID from the amnios of the cow.

Many other acids have, during the last few years, been added to the list we have given, and chemical investigations are constantly increasing their number. We have already more than seventy well determined acids.

This class of bodies is so important in chemistry, that we may be permitted to quote the opinion of an eminent and well-known writer upon the subject. "The uses of the acids are so many, and so important, that it is impossible to enumerate them. They are indispensable to various arts and manufactures; they are employed for culinary purposes, and for medicine; they act an important part in the great laboratory of nature; they produce that numerous class of bodies called salts, and form a great proportion of the mountainous districts of the globe.

"The vast masses of limestone, chalk, and marble, which are found in every part of the world, are combinations of lime and carbonic acid. The mountains of gypsum in the neighbourhood of Paris, and elsewhere, are combinations of lime and sulphuric acid. The fluor spar of Derbyshire is composed of lime and fluoric acid; and there are masses of common salt both in the eastern and western hemisphere, which contain such immense quantities of muriatic acid as would render every attempt to calculate the amount abortive."

"The large masses of celestine and ponderous spars in different parts of the earth, contain an incalculable quantity of the sulphuric acid; and the crysolite of Greenland is a compound of the bases of alumina, soda, and fluoric acid; silica, which possesses many of the properties of an acid, abounds in the form of gravel, and also in that of solid rocks, in every quarter of the globe: and several of the valuable minerals, together with those called precious stones, are combinations of the different earths with the chromic, or the phosphoric acid, not to mention the annual changes which the vegetable kingdom undergoes by the formation and subsequent decomposition of the vegetable acids.

"Many of these bodies are formed by the action of vegetable life, such as the mallic and citric acids; some are formed principally by chemical changes effected spontaneously on dead vegetable matter; as, for instance, the acetic; and others, as the sulphuric, occur in the mineral kingdom, and are also formed artificially, in great abundance."

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## SCRIPTURE EXPLANATIONS, NO. XXVIII.

"Turn again our captivity, O Lord, as the streams in the south."—Psalm cxxvi. 4.

IN the East the rivers in the dry seasons are little more than fleeting streams, and sometimes they are entirely evaporated by the powerful action of the sun's rays. The rainy season comes, and the beds, forsaken of the ancient river, begin to receive their annual tribute from the fruitful clouds, and the mountain-torrent, rolling in its accustomed channel, causes the streams to return again, changing the sandy waste into the majestic river, raising the sower's hopes, replenishing this parched land with the long-desired verdure, and man and beast again rejoice in the earth's abundance. Thus prayed the pious Psalmist:—"Turn again our captivity, O Lord, as the streams in the south:" that as the inhabitants of these sultry regions rejoice in the return of the reviving streams, so we, restored to our beloved country and temple, may rejoice in the long-expected deliverance.—*W. Brown.*

## BOTANY.—No. X.

### LABIATÆ.

This most natural order of plants is composed of such as are of universal recognition; for every reader is acquainted with the dead-nettle, mint, sage, and rosemary. Happily for distinction they are coupled together by a general character, just as obvious, when properly stated, as the plants themselves are familiar. This character is founded in the dispositions of the blossoms, which are placed in a whorl or little circle just above a pair of opposite leaves. This order was established, under a different name, by our countryman Ray, who was followed by Linnæus. The herbage is usually aromatic, as in the rosemary and horehound; often bitter, but always harmless. The corolla is generally two lipped, and always irregular. The stamens are four in number, placed under the upper lip; one pair longer than the other. Another easy mark of distinction is found in the uniform presence of four seeds at the bottom of the cup or calyx, which does not fall off, but stays to accommodate the seeds with a lodging till they are ripe; at which period they are black. This remark, in reference to the seeds, may be verified by looking at the common white or dead-nettle. The stem is always square, and the branches invariably opposite to each other.

### EXAMPLES.

*Lamium*—Upper lip of the corolla gracefully arched; the lower lip divided into two lobes, with a small tooth on each side.

*L. Album*, white archangel, or the common white nettle.—It has been called dead-nettle, because it is not provided with those sharp envenomed prickles, with which the stinging nettle is furnished, and to which it bears a very great resemblance.

*L. Purpureum*, red archangel.—Differs from the last in having the tips of the leaves blunt, and the flowers of a deep red or purple colour; common on all hedge banks.

*Ballota*.—There is but one species of this genus, the *B. Nigra*, or stinking horehound. This is nearly as common as the red dead-nettle, and is very apt to be confounded with it, and with the all-heal, which we shall presently describe. It may, however, be distinguished from them by its dull forbidding appearance and unpleasant smell; but very accurately by the presence of ten well-marked lines upon the calyx. This part of the flower is worth examination; for we see in what is always regarded as a disagreeable weed, a cup that bears all the obvious marks of the most finished workmanship, and which consequently furnishes a pleasing and accurate character for distinction.

*Stachys*—This genus is chiefly distinguished from its kindred genera by the position of the stamens after the anthers have shed their pollen. At first we see them upright; but after their office of scattering that fine powder is accomplished, they seem as if averse to each other; for one pair is leaning towards one side, and the other pair towards the other side. The *stachys sylvatica*, or hedge all-heal, is common by hedges, and differs in its appearance from the purple dead-nettle by being more erect and taller than the latter. The size of the stem with its foliage gradually tapers to a point at the top. If in walking forth with a friend, conversation should flag for want of interest, we might at any time in summer pluck up the stachys, and point out the mutually averted position of the stamens. Many reflections upon the wisdom of God in creating, his goodness in diffusing instruction in every corner of his vast dominions, would spontaneously arise, and lead us to fresh remembrance of Him who has so kindly made and garnished all things for our use, improvement, and delight.

*Mentha Serpyllum*, mother of thyme—Its scent, which resembles the garden thyme, will always denote this plant, which may be found upon the elevated parts of heaths, and in mountainous places. The essential and distinguishing character of the *thymus* is found in the calyx, which is two-lipped, and has its mouth filled with fine hairs. If at any time we meet with a plant in travelling that resembles the mint in smell and general appearance, we apply to the calyx for a touchstone or criterion: if one lobe points upward and the other down, and if withal we see a barrier of white hairs defending the entrance, we put it down as belonging to the genus thymus, without further question. The wild basil, found in corn-fields, the field and the mountain calamint belong to this genus. The two last are sometimes met with on the road side, and may be known by their aromatic smell, and the presence of the criterion just described.

*Glecoma Hederacea*, ground ivy.—An extremely well-known plant, with round or kidney-shaped leaf, a blue flower, on all our ditch banks. If we pluck the flower of this strong-scented weed, and look at the stamens, we perceive that each pair of anthers are so placed that they compose a picture of St. Andrew's cross.

*Teucrium Scorodonia*, woof-sage.—The resemblance which the leaves of this plant bear to the common sage, will readily point it out among its wild companions. In the neighbourhood of London, especially about Hampstead-heath and Caen-wood, it may be found in the greatest abundance. Homer tells us that the nurse of Ulysses recognised her master, after an absence of twenty years, by a mole that grew upon the hero's great toe. It is the object of the botanist to look for marks equally unerring and satisfactory. Now, in the wood-sage we find the upper lip as completely abstracted as if it had been cut off with a pair of scissors. This circumstance leads us directly to the genus teucrium, of which the generic character is the absence of one upper lip.

*Betonica Officinales*, wood betony.—In every wood we find the wood betony. Its small purple flowers, weak stem, and scolloped leaves will serve to recall its name to our recollection, whenever our footsteps are directed through the opening glades and pathways of a sequestered wood. Among the foregoing examples, though few in comparison of the number growing wild in this country, the inquisitive reader will find materials for study and comparison. The square stem, the leaves coupled in pairs, the curious two-lipped blossoms, (corolla) the four stamens, paired in two friendly couples, of unequal length, are points of resemblance as general among the labiata, or two-lipped plants, as they are obvious and easy of recognition. We therefore commend the study of this very natural assemblage of vegetable creation to the particular attention of our readers. If any one should say, "I have but a little time to spare for recreation, I cannot afford to lose myself among the ever-doubling mazes of botanical disquisition," the answer is, that this is by no means necessary; for as the science is divided into wards or families, which we call orders, a person may take his choice, and study one division apart from all the rest. Nor is an apparatus of technicalities necessary; ten or a dozen well-defined terms will effectually do the business, when the object is single, that is, when one order only is studied. Should choice lead one to either the umbellifera or labiata, a never-exhausted source of remark and ingenious deduction would be found. All that is requisite is summed up in a patient observation, and the habit of recording the results of it upon paper: for one of the very best precepts for improvement in all studies is—Write down what you think.

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## THE PROGRESS OF CHRISTIANITY IN NEW ZEALAND.

The Rev. W. Yate says, that in New Zealand the door is now thrown wide open for the admission of christian missionaries, so that they might go east, west, north, and south, through the length and breadth of the land. There was scarcely an individual who was not ready to receive instruction by means of the schools, and by means of a preached gospel, if there were missionaries to provide them such instruction. The natives had come down in great numbers, earnestly praying that they might receive instruction, and that, to use their own mode of expression, their hearts might be so "bothered with the love of Christ," that they might no longer be able to act as they had done. A chapel was built, schools were formed, and about ninety men and women had been brought under the influence of christian society. The people to the southward had long been in the habit of fighting with the Bay-of-Islanders; they had made great depredations upon the people; they had destroyed numbers of their tribes; and the enmity seemed to be increasing. They had told the missionaries, that if any of them from the Bay-of-Islands attempted to go down and live there, they should not remain there long, for that they would drive them away, or destroy them. But God had enabled the missionaries to interfere with success. Three thousand of the Bay-of-Islanders had been prevented by their means from engaging in the work of destruction. Some persons were sent down at the risk of their lives, to request the missionaries to give the same instructions to them, which they had given to their countrymen. Formerly, the missionaries had not been allowed to land at that place; but on the present occasion, they were met by fifteen hundred natives; and when they landed, the chiefs said it was their intention to make some speeches. They called first upon an old chief, who spoke for nearly an hour, and who said, "The missionaries, he was sure, were come to that place to blunt the points of their spears—to snap their clubs asunder—to draw the bullets out of their muskets—to bury their bayonets in the ground—to bring this tribe and that tribe together—and to make them all to live in peace." A loud shout then burst from the whole assembly, "We will have them! We will have them! And then this tribe and that tribe shall live in peace, and we shall no longer kill each other as we have been accustomed to do." This gave the brethren great joy, for it convinced them that the Lord was at work among that people, though they had not been aware of it. The people were very anxious for an answer. The missionaries told them that when they were about to engage in any work, it was always their custom to seek guidance and direction from God. "Well, then," they said, "seek guidance and direction from God now." He told them that it was the intention of the brethren to hold a service, and after that to explain their views and intentions as to the requests the chiefs had made. He gave out a hymn, and, with five or six boys whom he had taken with him, raised a tune: to his great astonishment, he found that the majority of the people not only knew the words of the hymn, but joined in the tune to which it was sung. When he began to read the church service, his astonishment increased to find that they united in the confession, and in the various responses, with all their hearts and voices. The circumstance which had led to that which so astonished him was afterwards explained. A boy, a sort of slave, who had lived with him, and who had been redeemed with two or three blankets, had gone among them while on a visit to his relations, and had taken with him his prayer and hymn books; and with the little knowledge he had obtained, had established a sort of school, where he taught those who went to sing the tunes he had learned, and to join in various portions of the service of the church.

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## ROMISH CONFESSION IN FRANCE.

A Romish country curate was disputing with a bible and tract hawker, concerning that excellent tract, "The Blind Man and the Soldier," and observed, "Your books are very good, but they say nothing about the sacraments." "Why, sir, this book is only about a soldier's conversion; and therefore cannot mention every thing." "But if he were converted, he would have gone to confession, and received the sacraments: this is a protestant book. God has appointed confession; for he says, 'Confess your faults one to another.'" "Then if I should confess to you, sir," answered the hawker, "you should also confess to me; for the verse says, 'one to another.'"

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## BENEFITS OF THE ALLOTMENT SYSTEM.

In the evidence before a parliamentary committee, it was stated by Mr. Monk, to show the beneficial effects of allotments of land to labouring people, and the ease with which their bad habits may be amended, that formerly his cottages were in bad order; their pavements and windows broken:—"I had them all paved, and the windows glazed. I told the cottagers that I did not like shabby, broken windows, with patches of paper, and things stuffed in, or broken pavements, which they could not clean; and that I disliked Irish filth, and all Irish habits of living. I engaged, after the cottages were thoroughly repaired, to pay twenty shillings a-year for keeping them in repair. I undertook to make the repairs myself, and deduct the expense from this twenty shillings; but if no repairs were wanted, they were to have the whole themselves. This course, I find, formed habits of care; and their cottages are now so well taken care of, that very little deduction is annually made from the one pound. They now abstain from chopping wood carelessly on their pavement; and as I give them two score of fagots towards their fuel, I save my hedges and fences; and the cost of all this to me is not more than the keep of one fat coach horse. Many persons accuse the poor of ingratitude, but I find them the most grateful people alive for these little attentions."

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A Sinful Life.—He that lives in sin and expects happiness hereafter, is like him that soweth cockle, and thinks to fill his barn with wheat or barley, Luke vi. 44; Gal. vi. 7, 8.—*Bunyan.*

A Contrast.—Better to be a lost sheep than a goat or swine.—*Marshal.*

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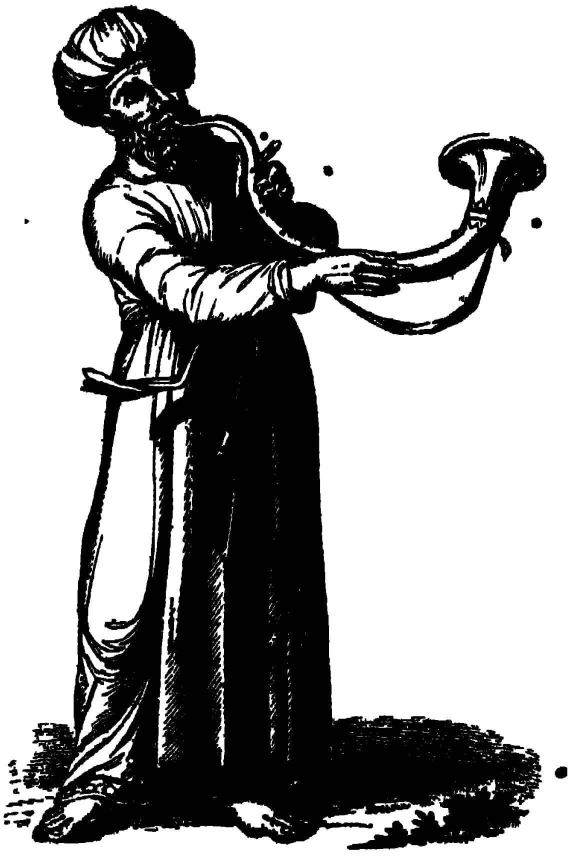

A LEVITE.

THE striking resemblance between the dress of a Levite, as shown in our engraving, drawn from the best authorities, and the modern oriental dresses, must be obvious to every reader. It is admitted that the Levites wore no particular habit till the time of king Agrippa, whose innovation in this respect is censured by Josephus. It appears their official dress was a simple robe. The trumpet which this figure is blowing, is intended, we suppose, to represent the ram's horn of holy writ.

The Levites were descendants of Levi, by Gershom, Kohath, and Merari, excepting the family of Aaron; for the children of Moses had no part in the priesthood, and were only common Levites. God chose the Levites instead of the first-born of all Israel, for the service of the tabernacle and temple, Num. iii. 6, &c. They served the priests in the ministrations of the temple, and brought to them wood, water, and other things necessary for the sacrifices. They sang and played on instruments in the temple, &c., they studied the law, and were the ordinary judges of the country; but subordinate to the priests. God provided for the subsistence of the Levites, by giving them the tithe of corn, fruit, and cattle; but they paid to the priests the tenth of the tithes; and as the Levites possessed no estates in the land, the tithes which the priests received from them, were looked on as the first-fruits which they were to offer to the Lord, Num. xviii. 21—24. God assigned them for their habitations, forty-eight cities, with fields, pastures, and gardens, Num. xxxv. Of these, thirteen were given to the priests; six of which were cities of refuge, Josh. xx. 7—9; xxi. 19, 20, &c. While the Levites were actually employed in the temple, they were subsisted out of the provisions in store there, and out of the daily offerings there made; and if any Levite quitted the place of his abode, to serve the temple, even out of the time of his half-yearly or weekly waiting, he was received there, kept and provided for, in like manner as his other brethren, who were regularly in waiting, Deut. xviii. 6—8.

## VISION.

It is a truth of physics, in the strictest sense of the word, that vision is performed by the eye refracting light, and making it converge to a focus upon the retina; and that the peculiar combination of its lenses, and the different materials they are composed of, correct the indistinctness which would otherwise arise from the different refrangibility of light; in other words, make the eye an achromatic instrument. But if this is not also a truth in natural theology, it is a position from which, by the shortest possible process of reasoning, we arrive at a theological truth; namely, that the instrument so successfully performing a given service by means of this curious structure, must have been formed with a knowledge of the properties of light. The position from which so easy a step brings us to this doctrine of natural theology was gained by strict induction. Upon the same evidence which all natural science rests on, reposes the knowledge that the eye is an optical instrument: this is a truth common to both physics and theology. Before the days of Sir Isaac Newton, men knew that they saw by means of the eye, and that the eye was constructed upon optical principles; but the reason of its peculiar conformation they knew not, because they were ignorant of the different refrangibility of light. When his discoveries taught this truth, it was found to have been acted upon, and consequently known, by the Being who created the eye. Still, our knowledge was imperfect; and it was reserved for Mr. Dollond to discover another law of nature, the different dispersive powers of different substances, which enabled him to compound an object-glass that more effectually corrected the various refrangibility of the rays. It was now observed, that this truth also must have been known to the Maker of the eye; for upon its basis is that instrument, far more perfect than the achromatic glass of Dollond, framed. These things are truths in both physics and theology; they are truths taught us by the self-same process of investigation, and resting upon the self-same kind of evidence.

When we extend our inquiries, and observe the varieties of this perfect instrument, we mark the adaptation of changes to the diversity of circumstances; and the truths thus learned are in like manner common to physical and theological science; that is, to natural history, or comparative anatomy, and natural theology.

That beautiful instrument, so artistly contrived, that the most ingenious workman could not imagine an improvement of it, becomes still more interesting and more wonderful, when we find that its conf[illegible]ation is varied with the different necessities of each animal. If the animal prowls by night, we see the opening of the pupil and the power of concentration in the eye increased. If an amphibious animal has occasionally to dive into the water, with the change of the medium through which the rays pass, there is an accommodation in the condition of the humours, and the eye partakes of the eye both of the quadruped and the fish.

So, having contemplated the apparatus for protection in the human eye, we find that in the lower animals, who want both the accessory means of cleaning the eye, and the ingenuity to accomplish it by other modes than the eye-lids, an additional eye-lid, a new apparatus, is provided for this purpose.

Again, in fishes, whose eye is washed by the element in which they move, all the exterior apparatus is unnecessary, and is dismissed; but in the crab, and especially in that species which lies in mud, the very peculiar and horny prominent eye which every body must have observed, would be quite obscured were it not for a particular provision. There is a little brush of hair above the eye, against which the eye is occasionally raised to wipe off what may adhere to it. The form of the eye, the particular mode in which it is moved, and, we may say, the coarseness of the instrument compared with the parts of the same organ in the higher class of animals, make the mechanism of eyelids and of lachrymal glands unsuitable. The mechanism used for this purpose is discovered by observation and reasoning; that it is contrived for this purpose is equally a discovery of observation and reasoning. Both propositions are strictly propositions of physical science.

The same remarks apply to every part of the animal body. The use to which each member is subservient, and the manner in which it is enabled so to perform its functions as to serve that appointed use, is learned by an induction of the strictest kind. But it is impossible to deny, that what induction thus teaches forms the great bulk of all natural theology. The question which the theologian always puts upon each discovery of a purpose manifestly accomplished is this: "Suppose I had this operation to perform by mechanical means, and were acquainted with the laws regulating the action of matter, should I attempt it in any other way than I here see practised?" If the answer is in the negative, the consequence is irresistible that some Power, capable of acting with design, and possessing the supposed knowledge, employed the means which we see used. But this negative answer is the result of reasoning founded upon induction, and rests upon the same evidence whereon the doctrines of all physical science are discovered and believed. And the inference to which that negative answer so inevitably leads, is a truth in natural theology; for it is only another way of asserting that design and knowledge are evinced in the works and functions of nature.—*Lord Brougham.*

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## AN AMERICAN MANUFACTURING TOWN.

Lowell is situated at the confluence of the Concord and Merrimack rivers. It is one of the largest manufacturing towns in the whole Union, and supplies one of the most remarkable instances of rapidity in growth. Twenty years ago this spot was a wilderness Then a small factory was built, which cost only 3,000 dollars. There are now more than twenty large mills, five stories high; with 3,000 looms and 8,500 spindles, upwards of 5,000 operatives, and a capital exceeding six millions and a half of dollars. The total population is 13,000. The water-power is very fine, and skilfully applied by means of reservoirs and canals; it is capable of working fifty more mills. The advantage to the comfort and appearance of the town in the possession of this power is very great, as it allows a vast business to go forward without the nuisance of universal smoke. This class of objects is rare in this country, though common in ours, and I was interested in a new course of observation.

It might be expected in this case, as in every similar one, that many fruitful causes of evil would come into action; but it was pleasing to find a corrective and antagonist power brought universally and successfully to act against them. Especially there is one feature in the state of this community that is peculiar and hazardous. There are not less than 4,000 young women attached to the mills, who have been drawn here by the hope of reward, abstracted from all the safeguards of their families, and transferred suddenly from the utmost retirement to promiscuous society. They are mostly the daughters of farmers, and have laudable intentions in coming. The family has every thing but ready money, and this is a method of getting it. Many of them are well educated: they might teach at schools; but they prefer this employ, as it gives them better remuneration. Others thirst for education; they come for six months, and then disappear; and again they come, and again they disappear. In the one instance they are procuring the costs of education, and in the other education itself. They bring with them a sense of independence and rectitude, and this disposes them to adopt means which contribute greatly to their preservation. Instances of sad defection and vice will of course occur, but they are remarkably "few and far between." The steady girls who work in a mill, band together as a sort of a club, and keep up a sense of honour through the establishment. If any one is suspected of bad conduct, she is reprimanded and suspended; and if bad conduct is proved against her, she is reported to the managing party, and a petition is presented for her removal. In an unquestionable case, they would leave the mill if the prayer of the petition was refused.

In many cases, where the evils are thus escaped, great good arises to the individual. Placed in new circumstances, where they are called to act for themselves for the first time, great energy, and sometimes great elevation of moral character, is elicited. The means of religion, too, are supplied to them with greater advantage. Many are brought under its influence, and those who are, are furnished with opportunities for benevolent and religious services, which they could not have had in their original and isolated circumstances. There are of this number of young women, for instance, about 1,000 who are united to christian churches, and about the same number who are in regular attendance on religious means.

It is, however, generally admitted, that whatever may be the advantages, these occupations mostly disqualify them for the quiet duties and cares of domestic life. In fact, this must, in a measure, be the effect, for there is nothing to exercise the domestic virtues; and it is likely that many may gain a taste for society, and appearance, and independent action, which they may not afterwards overcome. The dress, indeed, of the whole body, when not employed in the mill, was remarkable. It was not amiss, usually, in itself; but it was above their state and occupation. One was surprised to see them appear in silks, with scarfs, veils, and parasols.

The care which is shown to their welfare and safety by the heads of the factories, is also very worthy of praise. Boarding-houses are built for them by the corporations, or companies. Persons of good character are put into them, and the rate of payment is determined for them. These housekeepers are tenants-at-will; rules are laid down for their conduct, and transgression is followed by expulsion. They give and receive certificates of character with the young women.

The community at large are alive to the possible evils of their situation, and watch and labour to counteract them. Because temperance here has to encounter strong temptation, it has taken a most decided form. There is not only the usual Temperance Society; in addition to it is "The Total Abstinence Society," whose pledge extends to wine, cordials, and strong beer. This, too, is the favourite society; it has 1,900 members. I do not now judge the principle on which it acts; of course its influence must be great in promoting the sobriety of the town. There is also a considerable confederation here, under the denomination of "The Lyceum." It is a society for moral and literary purposes. There are reading-rooms, books, and weekly lectures, to meet the one branch; and for the preservation of the public morals, there are five committees appointed, each composed of not less than five members. Their duty is to take cognizance of five vices,—intemperance, profanity, sabbath-breaking, gaming, and lewdness. They visit, examine, and confer confidentially for this purpose, and adopt such means as their discretion may suggest. The lectures are made to assist this object.

They labour with much advantage in the sabbath-schools, as they have thus many of the younger girls under their care. In all these schools there are no less than 2,500 children, and 1,500 of them are factory girls.—*Reed and Matheson.*

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## SABBATH DAYS SHOULD BE PRAYER DAYS.

That sabbath is misemployed, which is not a day of prayer; and by prayer I do not mean the mere formality and semblance of prayer, but the breathing forth of the heart in supplications to God, in the name of our Mediator and Advocate Jesus Christ. Oh, if you would sanctify your sabbaths, you must make them days of serious, earnest prayer. It is the Spirit's work to sanctify: but the Spirit, though given freely, is yet to be sought and cherished by fervent prayer in the name of Christ. Behold here the secret of many a sabbath profanation! Prayer was neglected: hence, the Holy Spirit was withheld; hence, conscience became callous; the soul's enemy found access to the heart; pleasure tempted; gain allured; sin solicited; you had no strength to resist; you yielded; God was forgotten, his house neglected, his day dishonoured, and sin committed. Behold also here the secret of sabbath sanctification! Why do some steadily yet cheerfully resist temptations to sabbath-breaking? Are they not "men of like passions with others?" Why do they find, in the holy day, a delight which grows with their growth, and strengthens with their strength? The secret uniformly is, that they are men of prayer: they pray in their closets, in their families, and in the house of God: they will go home presently to pray over what they have heard: they find much to supplicate for themselves, their relatives, their ministers, their country, the whole church of Christ on earth. They often, on the sabbath, remember the benighted heathen and the unbelieving Jew, and pray God to bring them also into the fold of Christ. In prayer they confess sin; in prayer they implore mercy; in prayer they exercise faith; in prayer they commune with God, as children with their father; in prayer they fight against Satan; in prayer they gather strength to live to Christ's glory;

in prayer they grow willing evento die, and go and be with Jesus. *Are your sabbaths days of prayer?—Hambleton.*

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## CHEMISTRY.—No. XVII.

### SALTS.—NO. I.

The acids have the property of combining in different proportions with the earths, alkalies, and metallic oxides. Some of the most corrosive acids, when combined with these bodies, form compounds that have no such property; and hence, these acids were said to be neutralized, and the compounds were termed neutral salts. The word neutral, however, is now used only when the acid and the other body mutually saturate each other.

The salts are named after the acid and the other body of which they are composed; while the substance united with the acid is called the base. When there is not a sufficient proportion of the base to saturate the acid, the term super is employed: thus we say the super sulphate of potash; and if there be an excess of the base, the term sub is prefixed, as sub-borate of soda. Acids whose names terminate in *ic*, form salts which end in *ate*; those which end in *ous*, form salts ending in *ite*: thus we have the sulphate and sulphite of soda.

There was once much confusion in the science of chemistry, arising from the use of terms that did not describe in any degree the origin or nature of the substances themselves. This circumstance induced a number of French chemists to unite and form a new nomenclature, on an entirely new plan; and although it has many defects, it possesses many advantages over that formerly employed; and especially offers facilities to those who are studying the science. The substance formerly called gypsum or plaster of Paris, is now known by the name of sulphate of lime, being formed of sulphuric acid and lime; green copperas is now called sulphate of iron; salts of wormwood is carbonate of soda; saltpetre is the nitrate of potash. In the one case, there is no connexion between the name of the substance and its composition, in the other there is; and a person, with a very imperfect knowledge of chemistry, may be thus able to determine the composition of a substance.

The salts have been sometimes classed, according to the nature of their bases, under the three following divisions: the earthy, the alkaline, and the metallic. We shall only attempt to describe a few of the salts formed by some of the most important acids. When we consider the variety of combinations which the acids are capable of producing with the earths, alkalies, and metallic salts; and that some of the acids will combine with two bases, producing what are denominated triple salts; it is evident that there must be an immense number of this class of bodies. It has been said, that there are more than two thousand. We cannot therefore be expected to do more than briefly describe some of the most remarkable among them.

The salts formed with sulphuric acid are called sulphates. This acid unites with all the earths and alkalies, except silica, and with many of the metals. The sulphates are remarkable for their bitter taste, and insolubility in alcohol, by which substance they may be precipitated when in aqueous solution. They are generally incapable of decomposition by heat. Allusion has been already made to some of this class of salts, such as the sulphate of barytes or ponderous spar; sulphate of soda, lime, alumina, and others.

The salts formed by the sulphurous acid called sulphites, are distinguished by a disagreeable smell, resembling the fumes arising from burning sulphur; and, when subjected to heat, sulphur may be obtained from them; and they may be converted into sulphates by exposure to the air.

The muriatic salts are distinguished by the following properties: they are easily volatilized without decomposition, unaltered by fire, and yield muriatic acid when united with sulphuric acid. The most important of these salts are the muriates of barytes, potash, soda, strontites, lime, gold, silver, and iron.

Many of the salts that are formed with nitric acid are possessed of important properties: such as the capability of dissolving in water, and of crystallizing when in the act of cooling. When heated to redness, they will ignite and explode with combustible bodies, which may be proved by throwing a small quantity of powdered charcoal on heated nitric acid. The nitrates are decomposed by heat, and yield during the process oxygen gas. The principal of these salts are the nitrate of potash, or saltpetre, found native in great abundance, particularly in the East Indies; the nitrate of barytes; strontites; magnesia; silver; copper; and lead.

The phosphates are not decomposed by

heat; are soluble in nitric acid; and partly so in sulphuric. They are capable of being fused into glass. These are the phosphates of barytes and strontites; the phosphate of lime, which is the basis of bone; the phosphate of soda, used in medicine; and the phosphates of iron, lead, and a few others. The phosphites, formed from the phosphorus acid, are not employed for any useful purpose.

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## OLD HUMPHREY, ON THE ABUSE OF RICHES.

"HE DIED WICKEDLY RICH," said a good man in speaking of one who had left the world with great reputation; and though the words were neither spoken to you nor to me, we may perhaps both find something in them that may suit us. I know not how it may be with you, but my money bags are not so many as to stand in my way, nor to occupy much of my reflection. If you are differently circumstanced, look about you, for the words, "he died wickedly rich," are well worth your attention. I think it was John Wesley who said that if he died worth more than ten or twenty pounds, I forget which, he would give the world leave to call him a thief, or something like it; but I am afraid that, whether we are churchmen or dissenters, the benevolence, the self-denial, the zeal, the perseverance and devotedness of heart to God, of that servant of Christ, are beyond what we even hope to attain: happy for us if we attain them in a degree. But though the John Wesley standard of self-denial be too exalted for men of meaner graces to attain to; though we may not be quite willing to go so far as he did, in giving up all we possess, except ten or twenty pounds, nor may it be quite right for us, yet may it be worth a thought how far we are at all acting on his principle; how far we shall be quite clear of the charge, when the green sod is springing up over us, of having "died wickedly rich."

Old Humphrey is no meddler; he has no wish to pry into your affairs; and whether you are worth twenty thousand pounds, or have only twenty groats in the world, he will neither think the better nor the worse of you on this account. The question is not, What are you worth? but, How are you using it? One man may die worth thousands, clear from all reproach; and another "die wickedly rich," by leaving ten pounds behind him.

It is the case sometimes, and Old Humphrey fears too often, that people of property persuade themselves, that in leaving money to poor relatives and charitable institutions when they die, they do all that can be reasonably required of them, and that indeed they deserve the reputation of being considerate, kind, and charitable.

But what kindness and charity can there be in leaving that behind them which they cannot take with them? It would do them no good to have it crammed into their coffins. Whoever has riches, and neglects to do works of mercy during his lifetime, "dies wickedly rich," even if he leaves every farthing he has in the world to charitable purposes. I do not know the chapter and verse in the holy scriptures that particularly directs us to leave our property to do good after our death, but I know plenty of texts that direct us to do deeds of kindness while we are alive. "Pure religion and undefiled before God and the Father," is, not to leave money to the widow and the fatherless when we can no longer keep it ourselves, but, while we are alive, to "visit the fatherless and widows in their a[illegible]ction, and to keep ourselves unspotted from the world."

Now, do not mistake Old Humphrey. He honours the memory of that man, who closes a life of kindness and christian charity by a benevolent bequest of his property, giving to christian institutions liberally; neither neglecting those who have a reasonable claim on his remembrance, nor passing by his poorer relations, friends, and servants. "These things" we ought to do, if we possess the means, and "not to leave the other undone." "Honour the Lord with thy substance, and with the first-fruits of thine increase;" and "Thou shalt not harden thine heart, nor shut up thy hand from thy poor brother," are commands that are to be obeyed in our lives, and not to be put off to our deaths.

But if it should happen that you are not rich in money; nay, that you are absolutely poor, do not think, on that account, that there is no danger of your dying "wickedly rich." One man may be rich in money, another in leisure time, a third in health and bodily strength, a fourth in talent, a fifth in influence, and so on. Now if you have either all or any of these kinds of riches, and do no good with them, you are in the same situation as the selfish miser who keeps his gold uselessly locked up in his coffers.

### THE FOUNDATION OF HOPE.

The late Rev. Joseph Hughes, in referring to his sister's death, in a letter to his cousin, says,—"It is not a maxim with me that 'every one who dieth, is saved;' but in the present instance, I can no more doubt of my sister's happiness than I can of Abraham's. But you, my dear cousin, place this hope upon a false ground, when you speak of her blameless life as the sure foundation: many (humanly speaking) of a blameless life have found themselves miserably deficient (I believe) when entered into the world of spirits: and suppose this blamelessness to be connected with internal universal holiness, still that holiness is not the ground of salvation,—it is only the evidence of being interested in it. Christ is the way and the hope of sinners; 'his blood,' not our merit, 'cleanseth from sin.' Be persuaded of this, and remember that 'by the deeds of the law no flesh shall be justified.' 'By grace alone we are saved, through faith, and that not of ourselves: it is the gift of God.' Trusting in our own honesty, benevolence, and acts of piety, is treason against God, as it calls in question the veracity and authority of him who has affirmed that Christ is the propitiation, and that his is the only name given by which we can be saved. My dear sister would have willingly renounced all idea of merit; she would have been shocked at the thought; she would have owned herself a poor helpless sinner, and given God all the glory of her salvation."

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### PIOUS MOTHERS.

Facts often carry more force than arguments. Bishop Hall, speaking in tender and affectionate terms of his mother, says, "How often have I blessed the memory of those divine passages of experimental divinity, which I have heard from her mouth! What day did she pass without being much engaged in private devotion? Never have any lips read to me such feeling lectures of piety as hers. In a word, her life and death were saint-like."

Philip Henry, usually called, on account of the spirituality of his mind and the amiableness of his conduct, the "heavenly Henry," was, in his earliest years, trained up by his fond parents in the nurture and admonition of the Lord, and he retained to the end of life a lively and grateful sense of the benefit thus received. "If ever," says he, "any child, such as I was, between the tenth and fifteenth year of my age, enjoyed line upon line, and precept upon precept, I did; and was it in vain? I trust not altogether in vain. My soul rejoiceth and is glad at the remembrance of it. The word distilled as the dew, and dropped as the rain. Bless the Lord, O my soul; as long as I live I will bless the Lord; I will praise my God while I have my being! Had it been only the restraint that it laid upon me, whereby I was kept from the common sins of other children and youth, such as cursing and swearing, and sabbath-breaking, I was bound to be very thankful; so that it prevailed, through grace, effectually to bring me to God, how much am I indebted to him! what shall I render to him!"

Mr. Gilpin gives a pleasing picture of the attention given by Mrs. Gilpin to the education of his excellent son, especially in the earlier stages of the work. "She was skilled in all the proper methods of dealing with his gentle spirit, and could elevate his yielding thoughts to God by the most familiar representations. She knew all the direct approaches to his heart, and was constantly watching the most favourable opportunities for making serious impressions on his mind. By her intimate acquaintance with the holy scriptures, she was prepared to entertain him with narratives of the most interesting kind; while, by her piety, she was enabled to turn that entertainment to some profitable purpose. Methinks I see him, at this moment, sitting in his little chair by the side of his tender guardian, and listening to her instructions with a face full of eager attention. Many a time have I seen her so occupied, while I have silently solicited a blessing upon their happy employment. Such were our joint labours, to raise our willing child, step by step, towards the fountain-head of blessedness; and our efforts were crowned with more than ordinary success."

We are not warranted to conclude, that early religious instruction is all lost, even when it seems so. The precious seed often lies long hid under ground, but springs up at last. One of the most touching passages in the confessions of the celebrated Augustine, is that in which he speaks of the tender solicitude of his devout mother, and owns the influence which her prayers and tears had, in checking his licentious course, and changing his views and pursuits. The late venerable John Newton, in the narrative of his eventful life, expresses the most ardent regard for his revered mother. She made it her chief business and pleasure to instruct her only child in the elements of religious knowledge. She stored his memory with whole chapters of scripture, with catechisms and hymns, and left no means untried to impress upon his mind the truths of christianity. This excellent parent he lost when he was but seven years old. Plunged into a wicked world, his youth and mature years were given up to almost every kind of vice and profligacy; yet he acknowledges, that after he was reclaimed by the grace of God, the instructions given in his childhood vividly recurred to his recollection, and were of considerable use to him. Gilbert West was at one time warped into the labyrinth of infidelity. But he did not feel at ease in his unbelief. The lingering impressions of reverence, made by maternal tuition, could never be quite effaced. In a letter to Dr. Doddridge, he says, "I cannot help noticing, on this occasion, your remarks on the advantage of an early education in the principles of religion, because I have myself happily experienced it; since I owe to the early care of a most excellent woman, my mother, that bent and bias to religion, which, with the co-operating grace of God, hath at length brought me back to those paths of peace from which I might have otherwise been in danger of deviating for ever. The parallel betwixt me and colonel Gardiner was, in this instance, too striking not to affect me exceedingly."

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### HEAVENLY TREASURE.

Use all diligence to gain such a treasure as lies above the reach of the storms of this world; a kingdom that cannot be shaken; namely, our peace with God in Christ, the pardon of our sins, and a well-grounded hope and assurance of eternal life. These are the things that lie out of gun-shot, and will render the greatest troubles that can befall this lower world, or us in it, not only tolerable, but small and inconsiderable; when, in the midst of all the concussions of the world, in the midst of losses of goods or estate, in the midst of storms, and confusions, and disasters, and calamities, a man can have such deep and settled considerations as these:—Though I can see nothing but confusions, and little hopes of their amendment, yet I have that which is out of the reach of all these; that which is infinitely more valuable to me than the best which the world can give; that which I can please and comfort myself in, notwithstanding all these worldly distractions and fears; namely, the assurance of my peace with the great God of heaven and earth. The worst that I can suffer by these discomposures, and the most I can fear from them is but death; and that will not only put a period to the things I suffer or can fear in this life, but will let me into the actual possession of my hopes, even such a state of glory and happiness as never can be ended or shaken. Such a hope, and such an assurance as this, will keep the soul above water, and in a state of peace and tranquillity, in all the tempests and shipwrecks that can befall either this inferior world or any person in it.—*Sir M. Hale.*

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**Faith.**—Our faith, or act of believing, cannot be a matter of justification, for that is an imperfect thing, and so cannot be reckoned in the place of perfect righteousness: for it must be a righteousness perfectly perfect that justifies, as it was a sin perfectly sinful that condemned. This righteousness also must be our own in a way of right, (as Adam's sin also was,) though performed in the person of another: Christ and Adam being parallels in their headship, the imputation of one's guiltiness and the other's righteousness are righteously applied to their respective seeds. And this was a main end of God's putting those he would justify into Christ: that he being made sin and a curse for them, they might be made the righteousness of God in him; and so might be just in justifying them, Rom. iii. 24—26.—*Cole.*

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**God's Presence.**—A sense of God's presence in love is sufficient to rebuke all anxiety and fears in the worst and most dreadful condition, Psalm xxiii. 4, Hab. iii. 17, 18. —*Owen.*

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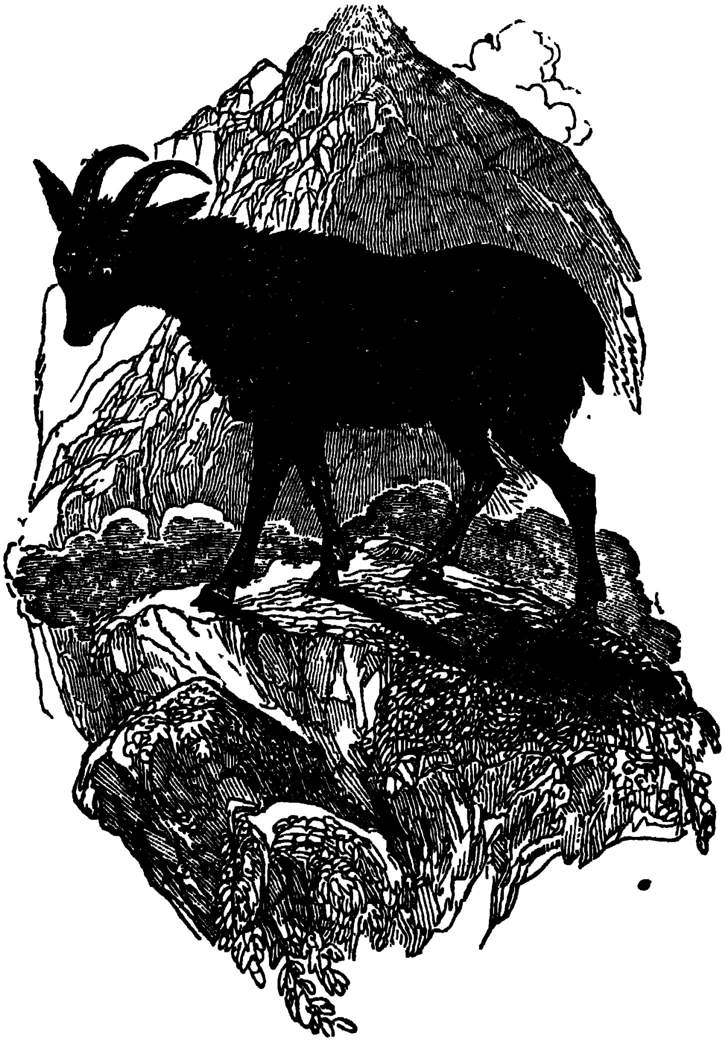

## THE THAR, OR BUBALINE ANTELOPE.

AMONG that extensive group of ruminant animals, the antelopes, which are so widely distributed throughout the central latitudes of the old world, there are several whose habitat is limited to the elevated alpine regions, where they experience a temperature reduced to that of the more northern portions of the globe. Expressly adapted to the localities assigned them, these antelopes, though strong, active, and resolute, have little of the grace, fire, and elastic tread which characterize the gazelle or spring-bok of the plains of Africa, or the common antelope (*A. cervicapra*) of the plains of India. Of the mountain antelopes thus discriminated from their more elegant congeners, the researches of Mr Hodgson in Nepal have brought to light (among other valuable additions to science) a species entirely new to naturalists, and of no ordinary interest. To this species he has given the name of bubaline antelope (*antilope bubalina*. Hodgson) and has transmitted a detailed account of it to the Zoological Society, which is published in their proceedings for 1832.

Approximating in its general form and characters to the goat tribe, as it does also in its manners, which dispose it to solitude and to mountainous situations, it is, as Mr. Hodgson observes, entirely devoid of the usual elegance of the genus to which it belongs. " It is a large, coarse, heavy animal, with bristly thin-set hair, not unlike that of the buffalo. The body is short and thick, the chest deep, the neck short and straight, the head coarse and spiritless, though not remarkably large; the eye poor, the limbs, for an antelope, thick and short, and the hoofs short and compact." . . : . "It is seldom found in herds, however small; and the full-grown males usually live entirely alone, except during the breeding season. Of all the deers or antelopes of these hills it is the most common. It tenants the central region, equidistant from the snows on the one hand, and the plains of India on the other; and though it be found every where within that central space between the Sutlege on the west, and the Teesta on the east, it is more frequent in the eastern than in the western half of the tract so defined, or in Nepal Proper. The female is scarcely distinguishable from the male except by her somewhat inferior size, smaller horns, and paler colour." . .. "The Nepalese call this animal the thar. The chase of it is a favourite diversion of the Gooroony tribes especially, who usually kill it with poisoned arrows. Its flesh is very coarse and bad, but there is plenty of it; and these mountaineers, who are apt to look to the quantity more than the quality of such flesh as a Hindoo government deems lawful food for them, prize the thar very highly, and hunt him very eagerly."

The thar, or bubaline antelope, when full-grown, stands upwards of three feet high at the shoulders; the horns are short, conical, recurved, and ringed with closely set prominent rings, for two-thirds of their distance from their base; these rings are, however, broken by longitudinal furrows or grooves, irregularly disposed, running up from the base: the ears are large, erect, and somewhat pointed; the eye is inexpressive, but of moderate size; the neck slightly elevated and straight, without any of that graceful turn and bearing which we expect in the antelope: the limbs are strong, short, and admirably framed for climbing the steep sides of the craggy mountains. The hair is coarse, bristly, and thinly set, lying close upon the skin, except along the back of the neck, which is furnished with a semi-erect straight mane of long coarse hairs. The general colour of this remarkable animal is deep black, clouded on the sides and under parts with rusty brown, which prevails especially on the limbs; the horns and hoofs are black; the former measuring eight inches in a straight line. The tail is short, narrow, and deer-like. Of the bubaline antelope no living example has ever been seen in Europe, nor does any perfect skin exist in any European museum: and, in fact, until introduced to notice by Mr. Hodgson, no naturalist was previously aware of its existence. M.

## ROADS.

The earliest roads, properly speaking, in Britain were those made by the Romans; and nothing is more calculated to impress us with the ingenuity of that mighty people, than the remains of these works, which are continually unearthed in our time. Before the Roman invasion, the British had their *trackways*, which were not paved or gravelled, but covered with verdant turf. They were called postways and ridgeways; the latter because they followed the natural ridges of the country, or, instead of keeping a straight line, wound along the crest or sides of the chains of hills in their way. The Romans adopted these trackways, as far as was convenient for civil and commercial purposes; but for military transit they raised vast causeways or elevated paved streets, and placed towns and stations on them at regular distances, for the accommodation of troops on their march. Our Anglo-Saxon ancestors called the old Roman roads military ways; the British trackways the country roads; and distinguished the highways by one wagon's way, four feet broad, and two wagons' ways, probably eight feet or more; which distinction, according to Mr. Fosbroke, shows the origin of our narrow village roads.

We subsequently find roads made of mortar and stone; of wood and stone; and roads for carriages, distinguished from bridle ways, or those purposely for horses. Narrow roads were called passes: openness in roads was thought essential to prevent robbery; and, for this purpose, all roadside thorns and wood were cut down.

It may, however, be supposed that in early times, the only roads, properly so called, were from one large town to another, with such cross tracks as infrequent communications would form. The first turnpike road was established by an act of parliament, 3rd Charles II.; but so insensible were the people to the improvement, that the mob pulled down the gates, and the new principle was supported at the point of the bayonet. Long after this period, however, travelling was dangerous and difficult; of which there is a recorded circumstantial proof. In December, 1703, Charles III., king of Spain, slept at Petworth, on his way from Portsmouth to Windsor, and Prince George of Denmark went to meet him there by desire of the queen. In the relation of the journey, given by one of the prince's attendants, he states: "We set out at six in the morning by torchlight to go to Petworth, and did not get out of the coaches (save only when we were overturned or stuck fast in the mire) till we arrived at our journey's end. We were thrown but once indeed in going, but our coach, which was the leading one, and his highness's body-coach, would have suffered very much, if the nimble boors of Sussex had not frequently poised it, or supported it with their shoulders, from Godalming almost to Petworth. The last nine miles of the way cost us six hours to conquer them; and, indeed, we had never done it, if our good master had not several times lent us a pair of horses out of his own coach, whereby we were enabled to trace out the way for him."*

Again, about 1746, a manuscript letter from a servant of the duke of Somerset, dated from London, and addressed to another at Petworth, acquaints the latter that his Grace intends to go from London thither on a certain day, and directs that "the keepers and persons who knew the holes and the sloughs must come to meet his Grace with lanterns and long poles, to help him on his way."

The Sussex roads remained proverbially bad within our recollection, and in an old rhyme is, "Sowseks ful of dirt and mire:" although at this moment, one of the finest roads in England, (considering the natural obstacles to be removed in its formation,) or that from London to Brighton, passes for nearly thirty miles through a portion of the county of Sussex.

In 1754, improved turnpike-roads were made, though not without renewing the opposition which attended their first introduction: tumults arose, and at the end of the reign of George II. a law was passed, enacting it felony to pull down a toll-bar; so difficult was it to reconcile the people to this great social improvement.

Of the state of travelling fifteen years previous to this date, we find a record in Dr. Cleland's Statistical Account of Glasgow; where Mr. D. Bannantyne states that, in 1739, upon two persons (named) making the journey from Glasgow to London on horseback, there was no turnpike-road till they came to Grantham, within one hundred and ten miles of London. Up to that point they travelled on a narrow causeway, with an unmade soft road on each side of it. They met, from time to time, strings of pack-horses, from thirty to forty in a gang, the mode by which goods seem to be transported from one part of the country to another. The leading horse of the gang carried a bell to give warning to travellers coming in an opposite direction; and when they met these trains of horses with their packs across their backs, the causeway not affording them room, they were obliged to make way for them, and plunge into the road-side.

In 1760, fifty miles a day was considered a prodigious rate of travelling, although to announce so important an event as the death of George II. The coach from Edinburgh to London started once a month, and occupied sixteen or eighteen days on the journey. A person may now start from Edinburgh on thursday evening, have two spare days in London, and be back again in the Scotch metropolis to breakfast on the next thursday.—*Domestic Life in England.*

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## A BIRD'S EGG.

When a bird's egg is examined, it is found to consist of three parts; the chick, the yolk in which the chick is placed, and the white in which the yolk swims. The yolk is lighter than the white; and it is attached to it at two points, joined by a line, or rather plane, below the centre of gravity of the yolk. From this arrangement it must follow that the chick is always uppermost, roll the egg how you will; consequently the chick is always kept nearest to the breast or belly of the mother while she is sitting. Suppose, then, that any one acquainted with the laws of motion had to contrive things so as to secure this position for the little speck or sac in question, in order to its receiving the necessary heat from the hen—could he proceed otherwise than by placing it in the lighter liquid, and suspending that liquid in the heavier, so that its centre of gravity should be above the line or plane of suspension? Assuredly not; for in no other way could his purpose be accomplished. This position is attained by a strict induction; it is supported by the same kind of evidence on which all physical truths rest. But it leads by a single step to another truth in natural theology,—That the egg must have been formed by some hand skilful in mechanism, and acting under the knowledge of dynamics.—*Lord Brougham.*

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* Annals of Queen Anne, vol. ii. App. No. 3.

## BOTANY.—No. XI.

### JASMINEÆ.

This interesting and natural group of shrubs and trees take the general name from the jasmine or jessamine, that favourite of oriental poetry. It is composed of the privet, the olive, the ash, and the lilac, and a few others of less notoriety. They are allied to each other by the presence of a single pair of stamens in each flower, and by a calyx and corolla, if present, divided into twice that number of segments. The privet and the lilac are generally, during the early part of summer, within reach; and will readily furnish subjects for comparison, which will prove to the observer, that the same general characters apply to them both. The small flowers of the ash contain only two stamens with a calyx, which, when present, is divided into four segments. The paucity of seeds in this family corresponds with the fewness of the stamens, for the number rarely exceeds two. The fruit is sometimes pulpy, as in the olive and privet; at others merely a capsule or dry case, as in the ash. In the last mentioned, the curious manner in which the capsules are expanded into a wing-like process, is a matter of common observation, though the progress of the expansion, from its earliest commencement to its final developement, would not be unworthy of a careful and enlightened attention. Soon after the appearance of this article, the privet will have ripened its berries; when the student of botany and the inquisitive reader will have an opportunity of examining the position and structure of those parts, which are destined for the reproduction of the species. This examination, in many instances, requires a well-practised eye; but in the privet, the elements of increase are so obvious and convenient, that a happier opportunity cannot offer itself of teaching our uninitiated friends how to ascertain and distinguish them. After the dark pulpy portion of the berry has been removed, a white ball will be found, which, when opened, will present a little body, somewhat in shape like a fire-screen or a fan, with a short handle. This minute member of the seed just described is no other than the embryo. When the seed is deposited in a suitable bed of earth, the handle of the little fan *(radicle)* is prolonged into a root, to collect nourishment for the springing plant; while the broad part of the fan is extended into a pair of seed-leaves. A slight effort, requiring no great delicacy of hand will separate it into two distinct plates *(cotyledons)* The white fleshy substance *(albumen)* in which the embryo is embedded, is intended to nourish the seed in germination, till it is able to provide for itself. The reader is probably aware, that whilst the white of the egg and a part of the shell are, by the vivifying operation of nature, transformed into the various fluids and solids which compose the frame of a chicken, a part of the yolk is lodged within the body to supply its wants, till such time as it can provide for itself. There is, therefore, a beautiful analogy between the white substance just described and the yolk of an egg, inasmuch as both are destined to supply the wants of the future individual, till it is able to shift for itself. It was customary in the times portrayed by Homer, for the host to entertain the stranger with the best his house could afford; and then to dismiss him with some valuable present or presents, as a pledge of his kind and hospitable feeling. Such is the hospitality of nature, that not only bestows upon her nurslings what is necessary for their present condition; but at parting gives them certain remembrances of her kindness, to keep them at the commencement of their future journey. Those who feel but little relish for a minuter contemplation of nature, may find a lesson and repoof in Ps. xcii., "O Lord, how great are thy works! and thy thoughts are very deep. A brutish man knoweth not; neither doth a fool understand this." Amongst the most interesting subjects of this group are the following:

The common jasmine, *(jasminum officinale,)* the ornament of the cottager's garden, which still retains its Persian and Arabic name, indicating from whence it was brought to us.

The sambac, *(mogorium sambac)* The flowers of this highly scented jasmine are strung and worn by females in India as chaplets, in the same way as the blossoms of the gardenia are in the islands of the Pacific.

The ash, *(fraxinus excelsior,)* the stately and favourite tree of the painter. Before the introduction of Peruvian bark, the bitter and astringent bark of the ash was used for the same purposes.

The manna ash *(f. ornus,)* common in the south of Europe, and especially in Calabria, yields the manna of the shops. The wood of this tree was famous in antiquity for yielding the material of which the warrior's javelin was made.

Privet *(ligustrum vulgare.)* The pulpy

part of the berries is employed to give a colour to some wines.

Lilac (*syringer vulgaris.*) This most charming shrub is a native of Persia, and still preserves its Persian name. It was introduced into Europe in the sixteenth century, since which time it has spread over all the gardens of Europe. The generic name indicates a tube, for the stem is hollow, and is therefore applied by the Turks to form tubes for their tobacco-pipes.

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## A SABBATH WELL SPENT IS A FORETASTE OF HEAVEN.

St. Paul, in his epistle to the Hebrews, iv. 9, writes, "There remaineth therefore a rest" (literally, a sabbatism, or keeping of a sabbath) "for the people of God." We do not know very much respecting heaven. We are not able to understand it here. But I often think that a sabbath, duly sanctified, gives us perhaps the best idea we can have on earth of the blessedness of heaven. The sabbath is a day of rest: after the toils, cares, anxieties of the week, on this day you are invited to rest from them all, to come anew to Jesus for rest, to repose the soul upon the promises of God. Heaven is certainly a place of rest: "I heard a voice from heaven, saying, Write, Blessed are the dead which die in the Lord from henceforth: Yea, saith the Spirit, that they may rest from their labours," Rev. xiv. 13. Oh, what sweet thoughts may we have every sabbath morning! Now, heaven and rest are one week nearer: six more days of toil are over: last week's sufferings are gone: I am getting nearer my home, even my Father's house!

Further: the sabbath is also to be a day of holiness. And if we know nothing else of heaven, we know this, that it is a pure and holy place. The wicked hardly dare to deny or dispute that. The common conscience of man revolts against the idea of an unholy heaven, a mohammedan paradise of sensuality, a place resembling the Elysian fields of pagan antiquity. You know what the scriptures say: "Without holiness no man shall see the Lord," Heb. xii. 14. "There shall in no wise enter into it any thing that defileth, neither whatsoever worketh abomination, or maketh a lie; but they which are written in the Lamb's book of life," Rev. xxi. 27: and all, those whose names are written there, are here, in this life, called out of sin, brought to repent and believe the gospel, are justified by faith in Christ, are regenerated and gradually sanctified by the Holy Spirit. Yes; heaven is a place of holiness. Sinners, ye who refuse to keep holy the sabbath, must be made holy, or no heaven hereafter for you. But you cannot make yourselves holy. You may try it, but you cannot do it. "Ye must be born again," John iii. 7; receive a new nature, be made holy by the Holy Spirit; and for this, ask of God in Christ's name. As you would not be shut out of heaven, pray and beg of God, "Create in me a clean heart, O God," Psalm li. 10.

Heaven is also a place of gladness. And the sabbath, rightly observed, is eminently a day of gladness—a day of joy and praise. The worldly-minded, not understanding true spiritual joy, resort to their sports, pleasures, amusements; hence, in France, they open their theatres; hence, in christian England, the rich crowd to parks, the poor to tea-gardens and public-houses: and thus they observe the sabbath. Alas! they understand not spiritual joy, they have no idea of the joy of heaven. It is, to rejoice in the Lord, to delight in God, to see the beauty of holiness, to admire the perfections of Jehovah: it is to sing and wonder, to adore and praise, to grow in moral likeness to God, to have the love of God more and more shed abroad in the heart by the Holy Ghost. This is joy, well worthy of the name. And this joy may be yours, dear brethren, more and more all through life.

Lastly: heaven is a place where Christ, the Lamb that was slain, is the bond of union, the object of admiration, the theme of adoring love to all the redeemed, gathered together from all classes, kindreds, languages among men. And so on earth, on every Lord's day, to Him is "the gathering of the people," Gen. xlix. 10; in his house, high and low, rich and poor meet, or ought to meet, on the same level, as sinners looking to him for salvation. Then he is continually magnified in his people. True christians forget not their Lord on the Lord's day. Christ crucified is the theme of our preaching, the sum and substance of our doctrine, the motive to your faith and practice from sabbath to sabbath. Every believer loves to praise Christ and meditate on him on this day. The more he studies his person, character, and work, the more he sees of the fulness and glory of Christ.—*Hambleton.*

## GREENWICH FAIR.

The other day the following interesting fact was told me by one in affluent circumstances.

"When I was a young man," said he, "I worked five years at one place without ever asking for more than one holiday, and that one I shall have reason to remember all my days. When I applied for it, my master, who was one of the society of Friends, usually called quakers, said to me, 'Thomas, I have no objection to thy having a holiday; but I should like to know how thou dost intend to spend thy time?'

"'Why, sir, I have heard a great deal of Greenwich fair, and never having seen it, I intend to go there.'

"'Ay, Thomas! so I thought; but it is my duty to tell thee, thee hadst better not go. In the first place, thou wilt lose half a day's wages; in the next, thou wilt spend at the least two days' wages more; and it is not very unlikely that thou wilt get into bad company. What mischief bad company will do thee it is impossible to say, but it often leads young men to their ruin. Thou mayest run into some excess, and if thou thinkest rightly of the follies and accidents that excess brings about, sometimes ill health, and sometimes sudden death, thou wilt be persuaded, and wilt not go.'

"'Why, sir, I mean to walk there and back again, and that will cost nothing; then I can take a bit of bread and cheese in my handkerchief, and need not spend any thing; and as to bad company, I think that I am proof against any temptation of that kind.'

"'No doubt thee thinkest so, Thomas, but thee dost not know what Greenwich fair is. If thou hast made up thy mind to go, we will have dinner at one o'clock, that thou mayest be off at two; but again I tell thee that thou hadst better not go.'

"'Why, sir, I have set my heart upon it, and shall think it rather hard not to go there once in my life."

"'Very well, Thomas, at two o'clock thee mayst go.'

"Exactly at one o'clock my master ordered in dinner, and no sooner did the clock strike two, than he told me I was at liberty. It took me but a short time to get ready, and to set off for Greenwich with my little stock of provisions, to prevent my spending money. A great many people were going over old London-bridge; for all the way to Greenwich, on a fair-time, the road is like a market. At the foot of the bridge, at that time, there were some water-works, and I leaned over the bridge to look at them; but, though I thought of the crowds of people, of Greenwich fair, and of the water-works that I was looking at, I thought more of what my master had said to me, than of all put together. When words once get a firm hold of you, it is a very hard matter to get rid of them. Here had I a half-day's holiday; victuals and money in my pocket, the sun shining, and crowds of people hastening on to enjoy themselves, and yet I could not go on. The advice of my master was uppermost in my mind, and I thought that I should do better to attend to it, and go back to my employment, rather than go forward to Greenwich fair.

"I cannot say but that it cost me a great deal to give up the point. I looked one way, and the other way, and the scales were so nicely balanced, that it seemed as though a feather would have turned them. When I thought of Greenwich, it seemed impossible to give up the fair; and when I thought of my master's advice, it was impossible to go on. At last, prudence won the day, and I made the best of my way back to my work.

"'Why, Thomas! is that thee?' said my master, when he saw me, 'why, I thought thee wert junketting at Greenwich: what has brought thee back again?' I told him, that in stopping on London-bridge to look at the water-works, I had thought over the advice he had given me, and had made up my mind to come back to my work. 'Thee beest a prudent lad, Thomas,' was the remark he made to me; and I set to work a great deal more comfortable in my mind than I had been since I first set off for Greenwich.

"Nothing more was said about it during the week, but when saturday night came, my master paid me my full wages, and then put down a guinea by itself. 'There, Thomas,' said he, 'take that; thou hast acted prudently in following thy master's advice, and not going to Greenwich, and I trust thou wilt never have occasion to repent it.'

"I verily believe that this was a turn in my life. Had I gone to Greenwich fair, it is not unlikely that things would have happened just as my master said; and if nothing else had occurred, perhaps it would have been the beginning of bad habits, which might have clung to me all my days: whereas, by taking good counsel, I had got a golden guinea, the good opinion of my master, and the consciousness of having acted properly."

This anecdote may serve as an encouragement to masters and servants: to masters who have principle enough to give good advice, and liberality enough to reward good conduct; and to servants who are industrious enough to be diligent in business, and prudent enough to take good counsel.

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### PRIDE.

In general pursuits, pride will often supply a stimulus to exertion. But there is much in its usual influence from which evil must result rather than good. It ever produces a dislike of obligation, which, in reference to the discovery of truth, must ever be exceedingly detrimental. To be proudly negligent of the labour of others, is, in such cases, to be busied with the alphabet of things, when we might be acquiring a mastery of their language. The man, moreover, who has formed an extravagant estimate of his own capability, will probably under-rate the effort necessary to success; and instead of profiting by the reproofs which his failures may call forth, will generally become indignant, warped in the future exercise of his judgment, and wedded to his mistakes, however preposterous. The history of every people is pregnant with the ill effects of systems and enterprises, which have owed their origin chiefly to this passion; either in its palmy state, when swollen by conceptions of superior power; or in its state of resentment, when wounded by opposition. In all matters of opinion it has been the parent of innumerable errors, and in social life it has produced all possible disorder and suffering. Whatever presumption has done, it has done as the first-born of pride; and whatever tyranny has done, it has done as the favoured offspring of the same parent.

Viewed in its influence on christianity, it must be apparent that the tendency of pride will be to give plausibleness and efficiency to every thing that may favour those elated conceptions as to the present condition of human nature, which persons of this character are ever disposed to entertain. When a man of this class is also a man of some benevolence, the flattering judgment which he has formed of himself may be the effect, in part, of a similar misconception with regard to the intellectual or the moral power of the mind in general; and his persuasion will perhaps be, that his plea is not urged so much in his own behalf, as in behalf of the species. —*Vaughan.*

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### NEW PRINTING PRESS.

The "Boston Mercantile Journal" describes a new press, invented within the last fourteen months, by Mr. Otis Tufts, of Boston, America. This power press approaches nearer perfection, says the journal, than any thing we have yet seen. It is manufactured in the most neat and finished style, and combines all the advantages of other presses, with several improvements which have never before been introduced.

In this press two friskets are used, by which means a person can be laying on a sheet at the same time that another one receives the impression. The modes also of regulating the impression, and distributing the ink with greater uniformity, are very simple and ingenious. The machine is put in operation by turning a crank; and 800 or 1000 impressions may be worked off in an hour. This press is one of the most perfect specimens of mechanism which we have seen, and is worked with but little noise or friction.

The first press of this description has been in operation for about two months, at the printing-office of Munroe and Francis.

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### HARMONY OF NATURE.

Oh! there is a harmony in nature, inconceivably attuned to one glad purpose. Every thing in the universe has a voice, with which it joins in the tribute of thanksgiving. The whispers of the wind playing with the summer foliage, and its fitful moanings through the autumnal branches, the broken murmur of the stream, and the louder gushing of the waterfall, and the wide roar of the cataract, all speak the praises of God to our hearts. Who can sit by the sea-side, when every wave lies hushed in adoration, or falls upon the shore in subdued and awful cadence, without drinking in unutterable thoughts of the majesty of God? The loud hosannas of ocean in the storm, and the praises of God on the whirlwind, awaken us to the same lesson; and every peal of the thunder is an hallelujah to the Lord of hosts. Oh! there is a harmony in nature. The voice of every creature tells us of the goodness of God. It comes to us in the song of the birds, the deep delicious tones in which the wood-dove breathes out its happiness, the gracefully melting descant of the nightingale, the joyous thrilling melody of the lark, the throstle's wild warbling, and the blackbird's tender whistle, the soft piping of the bulfinch, the gay carol of the wren, the sprightly call of the goldfinch, and the gentle twittering of the swallow.—*Miss Graham.*

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## SCRIPTURE EXPLANATIONS.—NO. XXIX.

"As the hart panteth after the water brooks, so panteth my soul after thee."—Psalm xlii. 1.

How ardent was the psalmist's desire after that Divine and holy intercourse, "which none but they that taste it know!" It was the fervent prayer of a gracious soul after higher attainments in the Divine likeness, and after a closer intercourse with the Divine Redeemer. Let us all earnestly desire this most excellent gift. To the hart, when hunted by its merciless pursuers, whether by the larger beasts of the forest, or by men as cruel as they, the thirst and exhaustion are intolerable. Under a tropical sun, mixing with dust and glare, life ebbs apace, the eyes forsake their office or present false images, and the feet, though anxious to bear their load, fail through utter exhaustion. The camel, which the Arabs beautifully style "the ship of the desert," is said by instinct to quicken its pace as he approaches the place of water, though many miles distant. How earnest was the desire of Dives for a drop of cold water to cool his parched tongue! little less earnest is the poor traveller, on eastern sands and under an eastern sun, for the precious reviving water-brooks, yielding only in sweetness and importance to the water of life. Thus the simile of the psalmist is full of force and meaning. May we feel the power of this pious sentiment! and we may be assured that our desires will be all realized.—*W. Brown.*

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## AFRICAN MISSIONS.

WHILE missionary exertions are being made on a large scale for the benefit of the emancipated negroes of the West Indies, it will be well to remember that the claims of Africa on christian sympathy are strong and urgent. The following extract from an American missionary report is well calculated to convince the most sceptical, of the existence of that wretched ignorance and barbarous cruelty which missionary labours, attended with the Divine blessing, are alone likely to remove.

"Africa! poor benighted Africa! is looking to us, and, extending her hands, asks our pity and commiseration. She has a heavy claim against us for injuries long continued and severe. In common with a sinful world, has our nation been guilty of tearing her sons and daughters from her coast, and leading them into dire captivity. Still is this horrible traffic in human blood carried on by some nations. Scarcely can a spot be found from the Senegal to the Congo, but what has been trodden by those monsters in human shape—dealers in the bones and sinews of our fellow-men; while hardly any region has received the merciful visits of the missionary of salvation. Would it rejoice your hearts to put an end to this accursed traffic in human flesh? Send the missionaries of Jesus to these regions of darkness and of blood. The king of one of the native tribes, in the interior of the western coast, literally walks to his throne in human blood. His palace is paved with the skulls and bones of his enemies slain in battle, and the walls and roof are ornamented with the same horrid trophies. The ruler of another nation sacrificed upon the grave of his mother no less than three thousand victims, two thousand of whom were prisoners; and, not long since, at the death of one of their sovereigns, the sacrifice was continued weekly for three months, slaying each time two hundred slaves! Do you wish to stop these horrid rites, and to convert the murderous ceremony into habits of civilized and christian society? Send then the missionary of Jesus to these gloomy abodes, where no sabbath delights, no gospel sounds, no bible enlightens! Africa may thus be regenerated."

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MY SAVIOUR.—I am sure my Well-beloved is God. And when I say Christ is God, and my Christ is God, I have said all things; I can say no more. I would I could build as much on this, My Christ is God, as it would bear: I might lay all the world upon it, John x. 28; John i. 49; Col. i. 16, 17.—*Rutherford.*

ONE SIN.—One leak will sink a ship, and one sin will destroy a sinner, Gen. ii. 17; Ezek. xviii. 4.—*Bunyan.*

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THE ROCK IN THE WILDERNESS.

## SCRIPTURE ILLUSTRATIONS.—NO. XVIII.

> "And a man shall be as a hiding place from the wind, and a covert from the tempest; as rivers of water in a dry place, as the shadow of a great rock in a weary land."—Isaiah xxxii. 2.

THE evangelical prophet, in this sublime passage, has beautifully described in glowing imagery the exalted work and Divine sufficiency of the Redeemer. This, like other passages, derives a point and an additional force by travelling under the sun of an Indian climate. The prophet, in the first part of the passage, alludes to the terrible tempests which sometimes desolate these countries. In the year 1831, no less than from fifteen to twenty thousand people were destroyed in Balasore district by the tempests of October. The ships on the coast were some of them thrown upon the shore by the breaking in of the sea, and afterwards left dry. Almost every thing, animal and vegetable, was swept away by the wild tornadoes to inevitable destruction. In vain were banks and ancient boundaries opposed to the wide-spreading waters, urged on by the tremendous whirlwind which raged. O how sweet would then have been a covert from the tempest! The next year's storm, equally dreadful, destroyed every house in the town; not one escaped without injury. The judge's house, though the strongest and best, withstood not the terrible hurricane. "Men's hearts failing for fear, the seas and the waves thereof roaring." "As a river of water in a dry place," life-preserving streams, and the "shadow of a great rock in a weary land." Next to water and food there is nothing like a shade. How it refreshes the weary pilgrim! Seldom do we find in Orissa such a shade as the "shadow of a great rock;" the deep shade of a venerable tree whose tough branches have borne storms of a century, afford, nevertheless, an inviting retreat from the broiling influence of the sun. This passage always recurs to my mind when sitting in the much-desired recess. Often whilst sitting under some shade, surrounded by the naked barbarians of these deep jungles, I thought myself as happy as any man could be. Let those who know spiritually this heavenly Rock, repose under its shadow, secure from the tempest May we build upon this Rock; and when the rain comes, and the floods descend, and may beat upon our house, our house shall not fall, for it is founded upon a Rock.—*Wm. Brown.*

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### DRESS.

The coxcombry of the thirteenth and fourteenth centuries must not be spared; since the clergy of the time in their pulpits, and the king in council, declaimed and decreed against its excesses. Thus, the beaux had their long-pointed shoes cut on the front with the rich tracery of a church window, and the points fastened to their knees by gold and silver chains. Their habits were of innumerable colours; the beard was worn long, and the head was embroidered with figures of animals, which, like lappets, buttoned beneath the chest, and were sometimes enriched with jewels. The females also wore as many colours as possible; little caps were fastened on with cords; and girdles with short swords hung before the stomach.

In the fifteenth century, gowns became less frequent, and the skirts of the tunic more puckered. The sleeves were like those of bishops; though few of our fair readers, and perchance once wearers of bishops' sleeves, are aware that they were in fashion nearly three and a half centuries ago. The cloaks, or appendages to tunics, had large flaps. In this century the jacket, originally the same as the doublet, differed materially from it; for, at this time, both were often worn together; then the jacket served as an upper tunic, and, like the doublet, it eventually lost its proper name, and is now called a coat. The breeches or hose were tight, the sleeves of the doublets were pinked to show the shirt, and the men wore their hair very long. Strutt, however, says, at the end of this century, the dress was exceedingly absurd and fantastical, so that it was difficult to distinguish one sex from the other The men wore petticoats over their lower clothing; their doublets were laced in front, like a woman's stays, across a stomacher; and their gowns were open in front, above and below the girdle. The coxcombry of the two preceding centuries was almost exceeded in the present. Beaux wore a boot on one leg, and a stocking on the other; and winter mantles, with sleeves that hung down to the ground, and licked up the dirt of the streets. The borders of these habits were frequently embroidered with verses of Latin, hymns or psalms in gold, and the garment itself was sometimes of red and white silk.

Among the female fashions, were outer corsets or boddiced waists, and enormous trains to the gowns, which were discontinued for borders about the middle of the century. There were two peculiar head-dresses: one was the horned, of two elevations, like a heart in cards, with the bottom cut off, as shown on a monumental brass of Maud, wife of John Fosbrok,* in Cranford Church, Northamptonshire; this lady having been nurse to King Henry VI. The other extraordinary head-dress was the steeple-fashion: so immoderately high and broad was this head-gear worn, that we read of the doors of state apartments being raised and widened, in 1416, that the head-dresses of the company might have room to enter. The fabric was supported by a horn on each side, and from each top was suspended a silken streamer, which fluttered in the wind, or crossed the breast, and was tied to the arm.

In this century should not, however, be forgotten the common bonnet, that is, one with shades over the cheeks, which now first appears. Shoes also were regularly manufactured, and the Cordwainers' Company incorporated in 1410: the queen of Richard II. introduced the piked shoes, with chains, &c, and Edward IV. proclaimed that beaks of skin and boots should not exceed two inches in length, upon pain of cursing by the clergy, and a fine of twenty shillings; and any cordwainer that "shod" any man or woman on the sunday was to pay thirty shillings. The piked shoe next gave way to the rosette fastening. Ribands of every colour, except white, the emblem of the depressed house of York, were had in esteem; but the red, like the house of Lancaster, held the pre-eminence; thus denoting the antique origin of the rosette of our day, from the full-blown riband rose of the house of Tudor. Representations of ladies in hunting-dresses at this period differ but little from the present riding-habit: one bears a bow in her hand and a quiver of arrows at her side, and another has a horn, resembling a bugle, slung from the right shoulder across to the left side.—*Domestic Life in England.*

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* Ancestrix of the Rev. Tomas Dudle Fosbrok, to whose valuable "Encyclopædia of Antiquities," we are indebted for many of the leading facts of the present paper.

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## CHEMISTRY.—No. XVIII.

### SALTS.—NO. II.

THE salts formed by carbonic acid are called carbonates. If sulphuric acid be poured on any of these salts, they will effervesce, and evolve carbonic acid. Many of them are found abundantly in a native state; particularly carbonate of lime, of which chalk, limestone, and marble are varieties. Among the carbonates we may mention that of potash, usually called salt of tartar; the carbonate of ammonia, the common smelling salt; and the carbonates of soda, barytes, strontites, and magnesia. The carbonic acid will also combine with copper, tin, and other metals.

As the salts that are formed by chlorine were not described when that substance was treated of, they may be here mentioned. The chlorates are a remarkable class of salts, possessing properties that distinguish them from all others. When raised to a high temperature, in connexion with a combustible body, they explode with great violence by friction, and sometimes without any mechanical force. When mixed with sulphur and charcoal, they produce the most dreadful explosions; while, in some instances, they have nearly proved fatal to those who have experimented on them. The chlorates are capable of being dissolved in water. Chlorine combines with potash, soda, lime, and magnesia.

The FLUATES, so named from their base, fluoric acid, are capable of decomposition by sulphuric acid, and yield a vapour that has the property of corroding glass. They are not altered by the application of heat, and are scarcely soluble in water. The fluates of lime, soda, ammonia, and alumina, are the most important.

The BORACIC SALTS, called borates, are all capable of being melted into glass. By mixing them with different metallic oxides, glass of various colours may be made. They are not subject to decomposition from heat. The borates of barytes, lime, magnesia, and potash, and the sub-borate of soda, called in commerce borax, are the most important.

The ARSENIC SALTS, or ARSENIATES, when heated with charcoal, yield arsenic, which may be known by its peculiar smell, resembling that of garlic. We have also the arsenites, the tungstastes, the acetates, the tartrates, the citrates, the camphorates, and the prussiates. Many of the salts have been formed by the chemist, but can be applied to no particular use; while others, with those that are of native production, are of the greatest importance in domestic economy, medicine, the arts, and chemical examination.

Salts are distinguished from each other by their taste, and their power of resisting or yielding to the effects of heat; but more especially by the form of their crystals. We may here make a few remarks in relation to the phænomena of crystallization. All persons must have observed the variety of form assumed by different bodies when in a crystallized state; some having four, others six, eight, or more sides. Crystallization may be defined, in general terms, as the regular figures which bodies assume when their particles have full liberty to combine according to the laws of cohesion. An example of crystallization may be shown by a very simple experiment. Take a small quantity of sulphate of soda, (Glauber salt,) and after having dried it thoroughly, dissolve it in about three times its bulk of hot water. When perfectly dissolved, set the solution aside to cool, and the salt will gradually separate itself from the superfluous water, and form itself into crystals; or, if the water that has not combined with the salt be evaporated, a solid crystallized substance will be presented.

Bodies are crystallized both by solution and by fusion. Some of them will dissolve only in hot water, others in water at any temperature. The more gradually the process proceeds, the more regular will be the form of the crystals; but perfect rest will sometimes prevent the formation of crystals. The presence of atmospheric air is necessary during the act of crystallization; and even light has a tendency to accelerate the process. The water that combines with any substance, and forms part of the crystallized body, is called the water of crystallization; and the residue is called mother water; some bodies combine with a small portion of water, while others unite with considerably more than their own weight of that fluid.

When a salt has the property of absorbing water from the atmosphere, it is said to be deliquescent; and when it parts with its water of crystallization, and falls into powder, it is said to be efflorescent.

Some salts have the power of mutually destroying each other; an effect that is always produced when the acid of one has a stronger affinity for the base of the other than for that to which it is united; or, in other words, when the two acids mutually attract their bases from each other. In this case two new salts must necessarily be produced, and the operation itself is termed double decomposition.

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### DISCONTENT.

BEG of God a meek and quiet spirit, which is of so great price in the sight of God; and watch after your prayers, not only how the Lord answers, but how you endeavour. He that prays against discontent, binds himself to watch and strive against it, or else his prayers are sin. Beg an humble heart of God; the humble man is seldom discontented, he thinks that the least of mercies is good enough for the chief of sinners. Here is a poor house, coarse fare, hard lodgings, unkind usage; but it is good enough for me: any thing short of hell is mercy; if I have but bread to eat, and raiment to put on, it is good fare for such an one as I. And then beg a mortified heart to all that is in the world. When the heart is dead to the world, worldly troubles do not trouble. He that is dead to the world will save his bones whole: when crosses, straits, and troubles come upon him; it may be said of such a one, "Yonder man is dead already to the world, his heart is crucified to it; he feels nothing so as to be distempered by it." When we strip dead men, they struggle not; we may take all, they are not troubled at it O beg such a heart, that God may do what he will with thee, that his will may be done; and this prayer will procure patience and help against discontent.—*Steele*.

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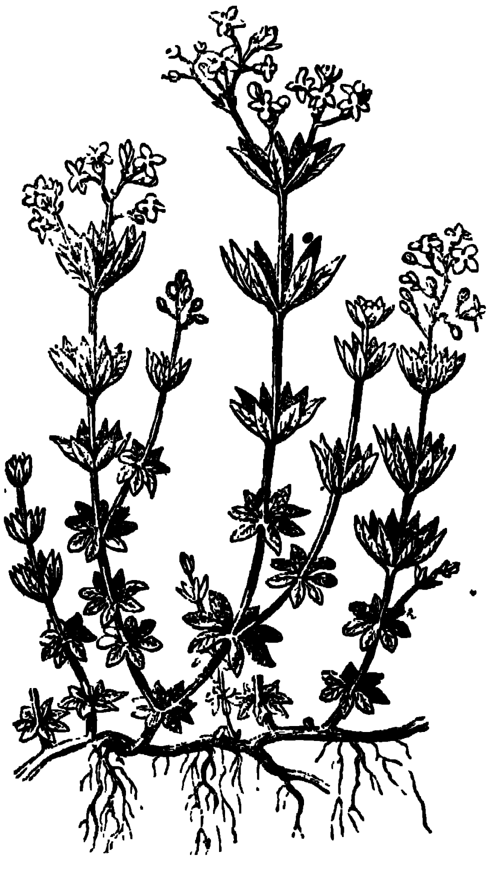
### BOTANY.—No. XII.

### RUBIACEÆ.

THIS is one of the most copious and most interesting orders to be met with in the whole compass of botanical science. A magnificent assortment of genera, distributed over all the parallels of latitude within the torrid and temperate zones, related to each other by points of great simplicity, is here presented to us. It embraces shrubs which, in reference to households, are of the highest importance; as, for example, the coffee shrub, while the widely circulated fame of the Peruvian bark and ipecacuanha, establishes its claim to the highest degree of medical reputation. Nor is the elegance of the foliage and the fragrance of the flowers less entitled to estimation. From those minute specks in the mighty expanse of the Southern Pacific, the Gardenia breathes a delightful perfume to welcome the sea-faring man as he approaches their coral shores; while every grove and thicket in the larger islands presents fresh specimens of this never-ending family, to entertain and puzzle the botanist. For, though the characters which connect them with the family before us, are easily read and understood, yet such is their affinity with each other, that the collector finds it extremely difficult to ascertain their differences, with that confidence which the mind feels when satisfied with it's own conclusions. We have thus taken a transient glimpse of the value of the rubiaceæ as yielding articles of diet, medicine, and perfumery; we may now add a fourth ground of interest—their importance in the arts; for that well-known dye, the madder, is the produce of the rubia tinctorum, which stands as the head and representative of the whole family, which takes its general denomination, rubiaceæ, from the relationship that the various members have to the rubia tinctorum. The general characters consist in a calyx, which forms a crown upon the top of the germen; a corolla, composed of four or five petals, sometimes more, united to each other below; for which reason it is sometimes called a monopetalous corolla. The stamens are alternate with and correspond in number with the united petals. The numbers of the essential parts just stated, taken in company with the inferior position of the germen, lead the mind of the botanist, in surveying a strange plant, to suspect that it belongs to the rubiaceæ. For further satisfaction, he may next examine the seed; when, if he is right in his conclusion, an elegant little leaf will be found imbedded in the horny or fleshy substance of the seed. The seed of the coffee, when recent, affords a beautiful example of this peculiar trait in the history of the rubiaceæ. In the middle of a horny substance, a little pale-coloured leaf is found, of a very exact and finished workmanship. This little leaf is no other than what is called the embryo, which fostering nature has lodged in a bed of future nourishment for its use in germination. This horny substance, which, in scientific language, is called the albumen, forms the material of which our coffee is made, The English plants, which belong to this family, are in appearance of a humbler description. The flowers are small, white or yellow. The divisions of the delicate corolla form a cross, and alternate with four minute stamens. The leaves are narrow, and placed in whorls about the joints of the stem, like the spokes of a wheel. The most common example is the cleavers or clivers, found on every ditch-bank throughout the summer. It is often employed in medicine by the London practitioners, who send messengers to collect it in the fields. It has obtained the name of cleavers, from its propensity to lay hold on the skin or clothes, by means of the little hooked points with which its external surface is overspread. There are twelve other species belonging to this genus, which may all be known by the whorl of narrow leaves at the joints, which vary in number according to the species, and the little cross-shaped blossom. Among them is the yellow bedstraw, (*galium verum,*) known by its profusion of yellow flowers, and its narrow thread-like leaves. In fact, the shape of the flower and the position of the leaves will always point them out to the collector. The following is a representation of the *asperula odorata,* or sweet-scented woodroof; it is often found growing in the open glades and grassy pathways of our woods and copses. The leaves are placed like eight radiating spokes round each joint of the stem. The flowers are small, and arranged in straggling clusters. An agreeable perfume is breathed from the whole plant.



We shall subjoin a short list of examples of, such as occur most frequently. They may be known from members of any other family in this country by the position in which the leaves grow; and, as we have before stated, the cross-shaped flower. A spontaneous effort to make ourselves familiar with the particular forms and differences of this group of obvious but interesting plants, would often dispel the vapours, and drive unprofitable thoughts and anxieties from the mind. Experience teaches us, that there is nothing so wholesome for a jaded understanding as a change of employment; and, independent of the intellectual gain, it is generally far more refreshing than any merely idle amusement that can be devised to entertain it.

*Galium aparine,* cleavers or clivers.—Stem, leaves, and seeds adhere to the clothes when the plant is touched.

*Galium cruciatum,* yellow-crossed wort.—Flowers golden-yellow, leaves and stem rough. Leaves in fours.

*Galium saxatile* —Remarkable for its weak, straggling, and its numerous milk-white flowers; on heaths.

*Shcrardia arvensis,* little field madder.—Minute blue and purple flowers; found amongst springing corn.

*Rubia tinctorum.*—Flowers yellow and berries black; in the south of England.

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## MY AUNT RACHEL.

One monday morning, as I had just poured out my aunt's second cup of coffee, a note was brought to me from Mrs. Selwin, entreating my assistance to purchase a mangle for a poor woman, whose husband had lately died of the cholera, and who was left with five little children. I closed the note with feelings of sorrowful regret; for my quarterly allowance was reduced to two sovereigns, and with them I was going that morning to buy my winter dress. Without speaking, I gave the note to my aunt; who, after she had perused it, gave me ten shillings.

"How sorry I am, aunt, that I cannot give ten more!"

"Well, my dear, you must give what you can."

"I have it not in my power to give anything, aunt."

I then explained the state of my finances. She made no remark, while the servant removed the breakfast things. As usual, I then placed the work-table before her, and was preparing to answer Mrs. Selwin's note, when my aunt, suddenly laying down the scissors, (with which she was cutting out the sleeve of a baby's frock for the Friendly Society basket,) said, "Ellen, I have just thought of a way in which you can help this poor widow." I turned from my desk in joyful surprise, "What is it, aunt?"

"How many yards of silk will you require for your dress, Ellen?"

"Thirteen: but what has that to do with the mangle, aunt?"

"Thirteen! that is a vast quantity for a slight figure such as yours."

"I can't possibly do with less, aunt."

"How much was necessary two years ago?"

"About nine or ten would have been sufficient then."

"Well, Ellen, instead of buying thirteen yards, make ten do: and calculating it at three shillings and sixpence per yard, you will have ten shillings to give for the mangle."

"Dear aunt, indeed ten will never do."

"Why not?"

"You were as tall three years ago as you are now: it is only putting a yard less in each sleeve, and a breadth less in the skirt; and it will do very well."

"Why, aunt, I should be quite a fright: I should be ashamed to show my face."

"No one thought you a fright three years ago, Ellen; and we need not be ashamed of anything but sin."

"But, my dear aunt, you seem to forget that the fashion is so entirely changed."

"Fashion, Ellen! What has a christian woman to do with fashion?"

"You would not surely, aunt, wish me to be so particular, so singular in my appearance; so very unlike the rest of the world?"

"The world! what have you to do with the world? Does not the Bible say, 'They are not of the world, even as I am not of the world,' John xvii. 14: 'Love not the world, neither the things that are in the world. If any man love the world, the love of the Father is not in him. For all that is in the world, the lust of the flesh, and the lust of the eyes, and the pride of life, is not of the Father, but is of the world. And the world passeth away, and the lust thereof; but he that doeth the will of God, abideth for ever,' 1 John ii.15—17:—'Be not conformed to this world, but be ye transformed by the renewing of your mind,' Rom. xii. 2. In 1 Tim. ii. 9, there is this command, 'That women adorn themselves in modest apparel, with shamefacedness and sobriety;' mark the expression, Ellen,—'not with broidered hair, or gold, or pearls, or costly array.' Note, again, child, the word *costly*, 'but (which becometh women professing godliness) with good works.' And you ought not to shrink at the thought of being particular, when you read in scripture, that the Lord's people are to be a peculiar people; very peculiar. Listen, Ellen. Again she read, 'For thou art a holy people unto the Lord thy God, and the Lord hath chosen thee to be a peculiar people unto himself," Deut. xx. 14. Again, 'Who gave himself for us, that he might redeem us from all iniquity, and purify unto himself a peculiar people, zealous of good works.' Tit. ii. 14. Again, in 1 Peter, ii. 9, 'But ye are a chosen generation, a royal priesthood, an holy nation, a peculiar people; that ye should show forth the praises of him who hath called you out of darkness into his marvellous light.' Ellen, our religion is but a name, unless it has a transforming power, a practical influence on our habits, our tastes, our tempers, our desires; it is only a form unless body, soul, and spirit are brought into obedience to the gospel of Christ."

"I think, aunt, you are too strict; you require too much."

"My child, it is not what I require, it is what God, your Saviour, requires." Again she opened the sacred volume: 'Then said Jesus unto his disciples, If any man will come after me, let him deny himself, and take up his cross, and follow me,'" Matt. xvi. 24.

"But, aunt, this is a thing of so little importance; such a trifle!"

"The more easy for you to perform: were you, like many of the primitive christians, obliged to change your soft attire, and to be clothed in sheep-skins and goat-skins, there would be stronger cause for reluctance."

"Well, aunt, I will consult with the dress-maker, and ask her if she cannot contrive to —"

"Ask your own heart, consult the word of God, child. Dare you be unfaithful to your duty, wound your conscience, and deprive yourself of the holy joy of relieving a poor fellow-creature—nay, more, a disciple of Christ—for the paltry, the despicable consideration of having a few more gathers in your sleeve, or a few more folds in your petticoat!"

"Hush! hush! dear aunt, say no more, I entreat; you have conquered."

"No, Ellen, not I; but if the grace of God has triumphed over worldly lusts and vanity, give the glory to Him to whom alone all praise is due." And as she spake she pressed her faded lips upon my glowing cheek, and tenderly folded me to her aged bosom.

(To be concluded in our next.)

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## HINTS TO TRAVELLERS.

How may a professing christian best defend himself against the danger of evil company?

The writer of the following remarks has to regret not having always acted upon the principles he recommends, yet, when he has done it, he has uniformly found them availing.

1. Look to God in secret prayer. Pray to be kept from the contagion of the company that you are in. Beg that you may "have no fellowship with the unfruitful works of darkness; but rather reprove them." By fellowship, the apostle means friendly and cordial intercourse and pleasure. We are cautioned against "foolish talking, filthiness, and jesting;" and, "if sinners entice thee, consent thou not." Now, prayer will enable us to act agreeably to these exhortations. Prayer is our best weapon; and can be successfully used when our companions are not aware of it.

2. Never be ashamed of your profession. You are not ashamed of telling what your secular profession or trade may be; then, why be ashamed to say that you profess christianity? If others see you sneak, as they call it, and that you wish to conceal your real character, it will only make them the more impudent and wicked. How often have christians, in some companies, permitted a succession of indecent songs, toasts, and volleys of oaths, merely because they wanted a little timely courage in checking them at first! The righteous should be as bold as a lion!

3. Imitate the frankness and zeal of the wicked. As soon as some men get into a coach, or arrive at an inn, they almost immediately display their colours, and avow themselves the servants of sin; they are impatient till they have opened their character; they give awful evidence that they are children of darkness. Why then should we be ashamed of being known as the children of light? Their consciences tell them that ours is the most honourable character; and yet we are afraid of receiving the honour they are obliged to give us. We may assert our characters, by politely checking the first improper remark, or reproving the first swearer we hear. If we were to begin singing hymns, or talking directly on religion, when we entered into company, how many a reproof, and oath too, should we have for our pains! and yet we let sinners play their parts with impunity! Whole companies have been silenced by a well-timed reproof. If a rebuke loses its effect, which is seldom the case, have the manliness to quit the company as soon as convenient; and the sooner the better, for this will put a keener edge upon your reproof than staying among them.

Lastly. Be beforehand with your company, when it can be done with propriety. Take an early opportunity of dropping a moral or serious remark, and it will operate in the way you wish it. A person was once in a coach, when it stopped to take up a gentleman, who had the appearance of being a clergyman. Silence was observed for some time, particularly by a loquacious swearing passenger. At length the supposed clergyman began to talk; and, at intervals, introduced improper words into his discourse. This opened the lips of the other; and he could then swear and talk nonsense with all the sanction he required. Another instance was this: A gentleman in a coach began his conversation by boasting of the plenty and prosperity we enjoyed as a nation; adding, "We want for nothing."—"No, sir," said a minister pleasantly, "we want nothing but gratitude to God." This timely hint took the company by surprise; and he found them very decent companions till they separated.

I cannot conclude without recommending to travellers to carry a parcel of religious tracts with them; such as "A Dialogue between a Traveller and Yourself," "On the Sabbath," "On Swearing," &c. These, offered to fellow-travellers, left at inns, given to waiters, &c, might be attended with great good, and help to counteract the prodigious evil communicated by profane and wicked men on their journeys. A FELLOW-TRAVELLER.

## WEB FEET OF WATER FOWL.

The web-foot of a water-fowl is an inimitable paddle; and all the ingenuity of the present day, exerted to improve our steam-boats, makes nothing to approach it. The flexor tendon of the toes of the duck is so directed over the heads of the bones of the thigh and leg, that it is made tight when the creature bends its leg, and is relaxed when the leg is stretched out. When the bird draws its foot up, the toes are drawn together in consequence of the bent position of the bones of the leg pressing on the tendon. When, on the contrary, it pushes the leg out straight, in making the stroke, the tendons are relieved from the pressure of the heel-bone, and the toes are permitted to be fully extended, and at the same time expanded, so that the web between them meets the resistance of a large volume of water.—*Lord Brougham.*

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## CORRUPTIONS OF CHRISTIANITY.

That the corruptions of christianity have been injurious to its interests, is but too manifest, whether we look to the past or the present. Men who distinguish between other things and their abuses, bring not their wonted fairness and discrimination to the history and circumstances of our holy religion. They do not hold astronomy responsible for the frauds of the astrologer, nor chemistry for the dreams of the alchemist. They admit that a science may be sound in its principles, while many of its votaries are deficient in intelligence; and that a system may be pure, while many who profess it are far from immaculate. But with respect to revealed religion, another rule would seem to have been tacitly agreed upon. Here the fault of the professor is commonly assumed as belonging to the thing professed; and a degenerate community, bearing the christian name, becomes a sort of demonstration against the pretensions of christianity. Many also, whose sense of justice is not so depraved as to admit that they should become examples of this disingenuousness, are, nevertheless, often influenced by it, and to a degree which they little suspect.

Now, we take strong exception to this conduct, and on the obvious ground, that the causes, deep-laid in human nature, and inwrought with all the forms of social existence, by which every thing on earth has been made subject to inquiry, should be expected to operate, in their full force, with regard to christianity. Among the systems of opinion, or codes of obligation which man has devised, there is no one that has not been grossly misinterpreted and misapplied, nor that has not been considerably mutilated and mixed up with foreign and contradictory matters; in other words, corrupted. And when the philosopher shall have detected and examined all the causes producing this effect on the systems originating with men, we are prepared to show, that to the whole influence of every one of these christianity is exposed; and to contend, as a consequence, that nothing can be more at variance with sound philosophy, or with the word of God, than to make that a reason for scepticism in one of these cases, which is never so admitted in the other.—*Vaughan.*

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## THE SENSES FALLIBLE WITNESSES.

If in the heat of summer, we descend into a cave, we become sensible that we are surrounded by a cold atmosphere; but if in the rigour of a frosty winter we descend into the same cave, we are conscious of the presence of a warm atmosphere. Now a thermometer suspended in the cave, on each of these occasions, will show exactly the same temperature; and, in fact, the air of the cave maintains nearly the same temperature at all seasons of the year. The body, however, being in the one case removed from a warm atmosphere into a cold one, and in the other case from a very cold atmosphere into one of a higher temperature, becomes, in the latter case, sensible of warmth, and in the former, of cold.

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Faith.—All my hope as to freedom from that darkness which is my burden, is from Christ's prophetical office, and my hope of freedom from the guilt, pollution, and power of sin, and acceptation with God, arises from his kingly and priestly offices. In one word, I have no hopes of any mercy, in time or eternity, but only through Him: it is through Him I expect all, from the least drop of water, to the immense riches of glory. Luke xxiv. 45; 1 Cor. viii. 6; Heb. ix. 28.—*Halyburton.*

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THE

# WEEKLY VISITOR.

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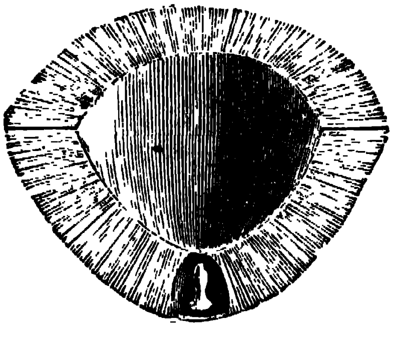
COCOS NUCIFERA, COCOA-NUT TREE

**PROFESSOR KIDD** has collected an interesting account of the cocoa-nut tree; to all the particulars of which the writer can add his testimony, having had many opportunities of witnessing its extensive usefulness and application in the various islands of the Pacific. One valuable property not fully mentioned in this description is, that the juice contained within the shell, just as it begins to deposit a white albuminous cream upon the inside of its tenement, has, when no water could be obtained, often allayed the traveller's thirst and recruited his strength. In that stage of the fruit, the cream mentioned above, said to be albuminous, from its resemblance to the white of an egg, is very nutritious and easy of digestion, as the writer has often experienced. Sometimes, when the sun is admitted to bear upon it, from which it is generally screened by the leaves, the juice is in a state of fermentation, which gives a sharpness to the taste which is very pleasing. The Tahitian females use the oil made from the nut for the hair; but as it soon turns rancid, a stranger, when he approaches their dwellings, soon finds that he and his Indian hosts entertain very different notions respecting the choice of perfumery.



We here give a drawing of a piece of the cocoa nut, to exhibit the situation and form of the embryo, or that minute germ and first principle of vegetable existence, which will expand by means of the albumen or meat of the nut, and attain two or three feet in length without any other nourishment.

Botanists, after Linnæus, call all fruit resembling plums, drupes. A drupe consists of an external skin (take the damson for example) or cuticle, then a pulpy layer called the flesh, next a hard nut or *putamen*, and lastly the seed. The cocoa-nut is a drupe; and if we take a recent specimen, we have first a thin skin or cuticle, then a fleshy layer, breaking ultimately by drying into woody fibres; next a hard shell; and lastly the seed, which only lines the internal cavity of the nut.

Professor Kidd says, "Among the vegetable productions of coral islands, the cocoa-nut tree stands pre-eminent in value; containing in itself nearly all those important properties which are found at large in that natural family of plants, the palms; and valuable indeed are those properties, if we may rely on the accounts which have been given of them by different authors; and the truth of those accounts there is no sufficient reason to doubt. Johnston, speaking of the abundance of the cocoa-nut tree in India, where he says it occurs to a greater extent than the olive in Spain or the willow in Holland, affirms that there is no part of the tree which is not applied to some useful purpose. Not only the cabins of the poorer natives, but large houses are constructed entirely with materials afforded by this tree; the trunk, when split, supplying rafters, &c.; and the leaves, when plaited, making roofs and walls, which are impervious to wind and rain. The statement of Johnston is confirmed by captain Seely, in his account of Ellora, who says that, 'when he was stationed at Goa, in 1819, he lived, as many others did, in a cocoa nut-leaf house; and that although the period was in the very height of the monsoon, and the house was on the sea-coast, it was comfortable and warm.' He believes that not a nail was used in the whole building: the rafters and supporters, &c., were fastened on with string made of the fibrous envelope of the cocoa-nut shell; the wood was the tree itself; the roof, walls, doors, and windows were the leaf. From the same authority we learn that the fibres, enveloping the shell of the nut, may be woven into a cable, by which ships of seventy-four guns have safely rode out heavy gales of wind, when European cables have parted"

"In the 'Wernerian Memoirs,' vol. v. p. 107, &c., is a very interesting account of the cocoa-nut tree; in which the author states that it will grow on the sand of the sea-shore, where scarcely any thing else will vegetate."

"From other sources we learn that this tree bears fruit twice or thrice in the year; that the half-ripe nut contains sometimes three or four pints of clear aqueous fluid, fragrant, and pleasant to the taste; and that the nut itself, from its highly nutritious qualities, is used as an aliment in all inter-tropical countries. In the volume of the 'Wernerian Memoirs,' above mentioned, it is said that in 1813 the number of cocoa trees cultivated in Ceylon, along a line of coast of about one hundred and eighty-four miles, was ten millions, and that that number was increased in the following years. It is also stated that it is fruitful from its eighth to its sixty-fourth year, and sometimes bears from eighty to one hundred nuts annually; that elephants are fed on cocoa-nut leaves; and that the ashes of the tree contain so great a proportion of potash, that the native washermen of Ceylon use them instead of soap"

"In the 'Nouv. Dict. d'Hist. Nat.,' tom. vii. p. 297, &c., it is stated, that, as in other palms, if the extremity of the sheath from whence the flowers of the cocoa arise be cut off while young, a white sweet liquor distils from it, which is used extensively as a beverage in India under the name of palm wine; that this liquor, if concentrated by boiling, deposits a sugar; that if exposed to the air, it acquires vinous properties at the end of twelve hours, and at the end of twenty-four hours becomes vinegar; that an oil may be obtained from the nut, which is not inferior to sweet-almond oil, and which is used almost exclusively in India, and that the shell is formed into cups and various other small articles."

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### OUR LIMITED KNOWLEDGE.

There is a striking contrast to be observed between the creature and the Creator. The person who wishes to attain to an exalted character in the literary world must make known his acquirements to others. How exactly opposite to this are the means adopted by Jehovah to promote his glory; for it is the glory of God to conceal from our view, whilst in this world, many things respecting his own nature, the mode of his existence, concerning the union of the Divine and human nature in the person of Christ, also the economy of his providence, and many things connected with a future state of existence. These things we know not now, but we shall know hereafter; and the concealment of them from our view in the present state, illustrates the glory of his character. This it does by showing his superiority to all created intelligences: were it not for this, the christian graces of faith, patience, and humility, would not be in such lively exercise. Besides, in the present state, we should be unable to bear further manifestations of them. Christ declared, "I have yet many things to say unto you, but ye cannot bear them now;" and had all the circumstances of our lives been told us when first entered on, we should have been overwhelmed with the view; whilst, on the other hand, had all the glory of the future state been fully revealed to us, we should be so overcome by it, as to be unable to attend to the duties of our stations. Let us, then, be grateful to God for what he has revealed to us in his word, submit to his authority, and live to his glory. C. J. M.

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### STABILITY OF THE PLANETARY SYSTEM.

Let us observe the structure of the planetary system. There is one particular arrangement which produces a certain effect, namely, the stability of the system; produces it in a manner peculiarly adapted for perpetual duration, and produces it through the agency of an influence quite universal, pervading all space, and equally regulating the motions of the smallest particles of matter, and of its most prodigious masses. This arrangement consists in making the planets move in orbits more or less elliptical, but not differing materially from circles, with the sun near the centre, revolving almost in one plane of motion, and moving in the same direction; those whose eccentricity is the most considerable having the smallest masses, and the larger ones deviating hardly at all from the circular path. The influence of gravitation, which is inseparably connected with all matter, as far as we know, extends over the whole of this system; so that all those bodies which move round the sun, twenty-three planets including their satellites, and six or seven comets, are continually acted upon each by two kinds of force; the original projection, which sends them forward, and is accompanied with a similar, and probably a coeval rotatory motion in some of them round their axis, and the attraction of each towards every other body; which attraction produces three several effects: consolidating the mass of each, and, in conjunction with the rotatory motion, moulding their forms; retaining each planet in its orbit round the sun, and each satellite in its orbit round the planet; altering or disturbing what would be the motion of each round the sun, if there were no other bodies in the system to attract and disturb. Now it is demonstrated by the strictest process of mathematical reasoning, that the result of the whole of these mutual actions, proceeding from the universal influence of gravitation, must necessarily, in consequence of the peculiar arrangement which has been described of the orbits and masses, and in consequence of the law by which gravitation acts, produce a constant alteration in the orbit of each body; which alteration goes on for thousands of years, very slowly, making that orbit bulge, as it were, until it reaches a certain shape, when the alteration begins to take the opposite direction, and for an equal number of years goes on constantly, as it were, flattening the orbit, till it reaches a certain shape, when it stops, and then the bulging again begins; and that this alternate change of bulging and flattening must go on for ever by the same law, without ever exceeding on either side a certain point. All changes in the system are thus periodical, and its stability is completely secured. It is manifest that such an arrangement is conducive to such a purpose, and so certainly accomplishing that purpose, could only have been made with the express design of attaining such an end; that some Power exists capable of thus producing such wonderful order, so marvellous and wholly admirable a harmony, out of such numberless disturbances; and that this power was actuated by the intention of producing this effect. The reasoning upon this subject, I have observed, is purely mathematical; but the facts respecting the system on which all the reasoning rests are known to us by induction alone; consequently the grand truth respecting the secular disturbance, or the periodicity of the changes in the system; that discovery which makes the glory of Lagrange and La Place, and constitutes the triumph of the integral calculus, whereof it is the fruit, and of the most patient course of astronomical observation whereon the analysis is grounded, may most justly be classed as a truth, both of the mixed mathematics and of natural theology.—*Lord Brougham.*

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### INSECTS.—No. XLI

### (*Smell.*)

THAT insects have the sense of smell is indisputable. Redi ascertained that no maggots are ever generated except from eggs laid by the parent flies; for when he carefully covered up pieces of meat with silk or paper, sealed down with wax, no maggots were seen; and that the parent flies attracted by the smell of the covered meat, not unfrequently laid their eggs on the outside of the paper or silk: thus deceived by the very sense that was given to direct their instinct.

In the case of bees, the odour of honey produces the most obvious result. John Hunter mentions that he has seen great commotion produced in a recent swarm, in wet weather, when he supposed the bees to have been hungry, by placing honey on the floor of a glass hive, which gave him a good opportunity of observing their proceedings. All of them appeared to be eagerly on the scent, and even those which were weak and hardly able to crawl, threw out their tongues as far as possible to get at the honey. The observations of Huber are still more interesting.

"In order," he says, "to ascertain whether the appearance of the flowers or the odour of the honey apprises bees of its presence, we placed honey in a window near a hive, where the shutters, almost close, still permitted them to pass if they wished. Within a quarter of an hour, four bees and a butterfly had insinuated themselves, and we found them feeding thereon. For the purpose of a still more accurate experiment, I had four boxes, different in size, shape, and colour, made with small card shutters, corresponding to apertures in the covering. Honey being put into them, they were placed at the distance of two hundred paces from my aviary. In half an hour, bees were seen trooping thither; and by carefully traversing the boxes, they soon discovered the openings through which they might introduce their bodies, and, pressing against the valves, reached the honey. Their extreme delicacy of smelling is here most obvious; for not only was the honey quite concealed from view, but its very effluvia, from being purposely covered and disguised, could not be much diffused.

"It is worthy of remark, that some flowers have a structure resembling the valves in the experiment. The honey-vessel of several species is situated at the bottom of a tube, enclosed or concealed among the petals; yet, in spite of this concealment, the bee finds it out, though its instinct, less refined than that of the humble-bee, affords fewer resources. The latter, when unable to penetrate the flowers by their natural cavity, drills an aperture at the base of the tube, through which it insinuates its sucker into the place where nature has placed the reservoir of honey. By means of this stratagem, and favoured by the length of its sucker, the humble-bee can obtain honey, which the hive-bee could only reach with great difficulty, if at all."

The varied effects of different odours on bees, were experimentally ascertained by the elder Huber, in numerous instances. He found that the mineral acids and volatile alkali acted with peculiar power. "On our presenting musk," he says, "to bees feeding before the entrance of their hive, they ceased, and partially dispersed, but without precipitation or beating their wings. We sprinkled some powdered musk on a drop of honey, into which some bees thrust their suckers as if by stealth, for they kept as far back from it as possible; but although they often appeared to suck it, we did not perceive it to become less in a quarter of an hour, long before which it would have disappeared, had it not been mixed with musk. Pounded assafœtida, whose odour is so disagreeable to us, upon being mixed with honey, and put at the entrance of a hive, did not seem to annoy the bees; for they greedily sucked all the honey, neither attempting to withdraw, nor vibrating their wings, till they only left the particles of the gum.

"Having remarked that bees, going out to the fields and coming home, turned aside in the air to avoid passing immediately over a piece of camphor laid before the entrance of their hive, I tried the effect of bringing some camphor towards their mouths, while their tongues were plunged into some honey placed on a card. All of them took flight; but after plying about for some time, they ventured to alight near the honey. While they were tempted again to try it, I threw some bits of camphor on the surface. They drew back a little, still keeping the tip of their tongues amongst the honey, and carefully avoided the camphor. One vibrated its wings as it fed, while some were less affected, and others not at all; but when I covered the honey entirely with camphor, they all instantly flew away. I had this card carried to my hives, while some honey was put on another clean one within reach of the bees. The latter was soon discovered, and the honey consumed in a few minutes; but an hour elapsed before a single bee came near the camphorated card; when, at length, two ventured to alight on it, and thrust their tongues into the edge of a drop of honey. Others followed, and two hours after it was covered with them, and all the honey consumed, the camphor alone remaining; whence it was proved that the attraction of honey overcomes their repugnance to the smell of camphor."

We shall only mention the effect of the odour of one other substance on bees; namely, their own poison, which Huber was curious to ascertain. The sting of one was accordingly extracted, and presented to some workers before the entrance of a hive. Although they had previously been quiet and tranquil, they became, all at once, much agitated. None flew away, but two or three darted against the sting, and one furiously assailed the experimenters. That it was the odour of the sting-poison alone which produced these violent emotions was obvious, from their appearing insensible of its presence when it lost its scent by drying. In another instance, bees were confined in a glass tube, and irritated with an arm of barley till they protruded their stings and left some poison on the sides of the glass The mouth of the tube was then presented to a group of bees at the entrance of a hive, and it soon produced the agitation of rage, obviously unaccompanied with fear.

(To be continued.)

## MY AUNT RACHEL.

(Concluded from page 295.)

I HAD just sealed my answer to Mrs. Selwin, inclosing a sovereign for the mangle, when Maria Parker called. After the usual salutations and greetings, she said the object of her visit was to inform my aunt that she wished to resign her office of sabbath-teacher, at the conclusion of the present quarter. Again my aunt's busy scissors were laid down.

"I am very sorry to hear it; but doubtless you have some very sufficient reason for relinquishing the duty?"

"Why"—replied Maria in a tone of hesitation—"the school is so very far off, and in winter one gets so wet and cold. My new bonnet and pelisse were entirely spoiled yesterday with the rain."

"I am sorry for that," said my aunt, "but you should always take the precaution of providing yourself with an umbrella."

"But really, ma'am, it is quite a labour to attend sunday after sunday, in all weathers; one is so wearied and exhausted."

"But," observed my aunt, "you are young, and in the full vigour of health, Maria."

"And all one's best time," continued Maria, without noticing my aunt's observation, "occupied; it is, indeed, too great a sacrifice."

"How can you call two or three hours *all* your time, child? You are only an afternoon teacher; there are some who attend all the day."

"Well, but I have another reason, ma'am."

"A better one, I hope," said my aunt, with a deep-drawn sigh.

"The school is very different from what it used to be."

"In what respect, Maria?"

"Since my dear friends, Emma and Fanny Watson left the school, it has been quite uncomfortable; some of the new teachers are so distant and repelling; there is such an atmosphere of ice about them, as completely freezes me: it is extremely unpleasant. I suppose they think it a degradation to speak to, or look at any one whom they conceive to be a grade below them in society. The school is not like the same; and I thought it my duty, ma'am, as you are the superintendent, to acquaint you with my intentions."

The wrinkles in my aunt's forehead became more contracted, and something like a frown passed over that serene brow—"My child," she said, "what were your motives when you undertook the important office of sabbath-teacher? I had hoped that the love of Christ constrained you; that an ardent desire for the extension of his kingdom, love and pity for the perishing souls of your fellow creatures, had induced you to devote yourself to this work. That the school is so far off, is one powerful reason why you ought to remain; because you are well aware of the great difficulty there is to obtain teachers on that very account. I deeply lament the loss that the school has sustained by the removal of our dear friends Emma and Fanny; but, being deprived of their efficient services, ought we not to be stimulated to greater exertion, to more vigorous efforts, to prop the tottering interests of the school? As to the deportment of those you complain of, I can only say, my child, that if pride were not deeply rooted in our own hearts, we should never be wounded by any little manifestation of it in the conduct of another. Maria! where is the love that beareth all things, hopeth all things, believeth all things, that endureth all things? That thinketh no evil? But you talk of sacrifices—sacrifices!!—My child, what sacrifices have you ever made? Behold the missionary and his wife standing on the deck of the vessel that is bearing them from their dear native land: their tearful eyes fixed on its fast receding shores: the indistinct forms of those beloved ones, whom they have strained to their hearts for the last time, are fading fast from their fixed and ardent gaze. Behold these soldiers of the cross standing on the inhospitable shores of New Zealand: or, see them undauntedly pursuing their most perilous course among the opposing icebergs of the north; enduring all the horrors of that inclement region, and fixing their habitation among the disgusting and wretched natives of Greenland. Remember Swartz, Henry Martyn, Felix Neff. Remember the martyrs of old." See their blood poured out, their forms blackened, and blazing in the fires of Smithfield, amidst the shouts of their cruel persecutors. Think of these, and then blush to call two or three hours on the sabbath a sacrifice."

Maria's dark and clustering locks could not conceal the crimson dye that flushed her cheek. As my aunt proceeded, I saw the tears steal, one after another, through the long dark fringes of her eyelids, and fall upon her trembling hands.

"Maria," continued my aunt, "I will not receive your resignation, until you have declared your intentions to another." Maria's half-raised countenance expressed surprise and inquiry. "When you return home, retire to your room, fall down before Jehovah's awful throne; tell him that you are weary of the work he has assigned you; that you prefer your own ease and comfort to his service; that your pelisse and bonnet are of more value than the immortal souls of those poor little children whom he has given to your charge and instruction; that two hours of the sabbath is too great, too costly a sacrifice even for Him—for Him who gave himself a sacrifice for your sins." Maria sprung from her seat, threw her arms round my aunt's waist, as if to prevent her departure, and sinking down upon the footstool, buried her face in her lap, and amidst her stifled sobs she murmured—

"Base, ungrateful, selfish girl! Oh, how vile I am! Pray for me, dear friends, that the sin of my heart may be pardoned and healed." Something had dimmed my aunt's spectacles; she took them off, and wiped away the moisture with the corner of her lawn apron; then spreading her hands upon the reclining head of the still weeping girl, spake of that blood which cleanses from all sin, of that strength which is perfect in our weakness; and as she spoke of the Saviour's tender love and piety, I marked a tear drop travelling slowly down the deep furrow that time had made in her withered cheek.

Need I say, we did not lose our teacher?

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## BOTANY.—No. XIII.

### DIPSACEÆ.

A LEADING and obvious distinction in this family, is the head into which the flowers are densely gathered together. This is exemplified in that well-known plant, the wild teasle, so remarkable for having its head of flowers fenced about with sharp prickles, which may be either employed to comb the hair, or dress cloth. To the former uses it is sometimes applied in pastime by boys. It is common every where during the months of summer on ditch banks and road sides, especially where the soil is good. Independent of the conspicuous head just mentioned, we find a curious and observable object in the disposition of the leaves, which occur in pairs, and are so united together by their respective bases as to form a cup, through the bottom of which the stem passes. These natural basins are filled with rain-water, destined in part, it would seem, for the refreshment of thirsty insects, which frequently, like their superior, man, in too great a haste to come at the expected pleasure, destroy themselves in the enjoyment. The collector of insects may always find many luckless individuals drowned in these repositories of moisture, which, if too much soddened to adorn the drawers of his cabinet, will generally serve for the purposes of examination and dissection. The members of this family are very closely related to each other in external appearance, though widely distributed over various regions of the earth, in the warmer as in the colder climates. In this country we meet with, in the course of summer excursions, the wild teasle (*dipsacus sylvestris*) just mentioned, the small teasle, and two species of scabious.

The wild teasle is generally so well known, and by the remarks we have made, so easy of detection to the observer, that it is not necessary for us to say more by way of a general description. The small teasle is not common in most places, but may be seen occasionally growing in lanes, and in situations where the soil has not been disturbed for many years. The prickly head of this plant is much smaller than in the common soil; the prickles, which are clothed with hair, less pungent. Amidst the ripening corn a large blue flower, which upon examination will be found to be composed of numerous little flowers, may often be seen. The blue colour inclines to what is called a pale blue and the scent of the flower is sweet. These two circumstances are sufficient to distinguish the scabious from the blue-bottle, which has its flowers of deep blue, without any agreeable odour. The other species of scabious, which is sometimes called the sheep's scabious, is extremely common upon our heaths, commons, and road-sides. It may be known by its small rounded head of blue flowerets, closely compacted together. This was once denominated the devil's-bit, because, as it was sagely pretended, the enemy of mankind, envying man the possession of a plant replete with so many virtues, bit a piece off the root! But without the help of the fable, the inquirer after nature may find a curious subject of observation in the leaves of this plant. The presence of what are, with sufficient accuracy, called spiral vessels, is to be met with in most plants; but from their frail and brittle texture, and their liability, when once stretched, to remain in that condition, it is difficult in many instances to observe them with prominence and satisfaction.

In the sheep's scabious, however, they present themselves in such a strong and conspicuous grace and loveliness, that when submitted to the eye of the most indifferent, they cannot fail to conciliate attention. To effect this object, the leaf should be pulled lengthwise, just hard enough to separate the contexture. If this opening be held up to the light, or, what is better, placed under a magnifier, various strains of these beautifully twisted threads will be seen in all their proportions. In addition to the mode of flowering, the studious will find that the stamens are generally four in number, adhering to the tube of the corolla, but not united into a tube, as in the dandelion, and its numerous relatives. The corolla grows upon the top of the calyx. The stigma is simple, and not divided into two horns, as in the plant last alluded to. The fruit is covered with a membranous case, surmounted by the calyx. The head is supported by leaves, which are called involucral, and resemble a calyx. Close by each little floweret we find a minute leaf, which is fancifully denominated the chaff.

In the teasle, these paleæ or minute leaves are sharp, in the scabious provided with hairs or bristles.

The four examples may stand thus, with their scientific names:—

*Dipsacus sylvestris*, wild teasle.
*Dipsacus pilosus*, lesser teasle.
*Scabiosa arvensis*, scabious.
*Scabiosa succisa*, sheep's scabious.

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## FURNITURE.

It has been truly said, that the artisan now enjoys luxuries in furniture which were, but three centuries ago, beyond the reach of the king. Even in the time of Elizabeth, the comfort of a carpet was seldom felt, and the luxury of a fork unknown. Rushes commonly supplied the places of the former, and fingers were the invariable substitutes of the latter. The bedding of this period is described to have been straw pallets, or rough mats, covered only with a sheet, under-coverlets of dogwain, and a good round log instead of a bolster or pillow. A householder, seven years after his marriage, thought himself well lodged with a mattress, or flock bed, and a sack of chaff for a pillow. Even "the lord of the town" seldom lay in a bed of down or whole feathers. An old writer says: "As for servants, if they had any sheet above them, it was well; for seldom had they any under their bodies to keep them from the pricking straws that ran oft through the canvass of the pallet, and rased their hardened hides." Again, in Skipton Castle, one of the most splendid mansions of the north, at this period, there were not more than seven or eight beds, nor had any of the chambers either chairs, glasses, or carpets. In a merchant's house, about the same period, we find the parlour had wainscot, a table, and a few chairs; the chambers above had two best beds, and there was one servant's bed; but the inferior servants had only mattresses on the floor. Yet this merchant is supposed to have been better supplied than the neighbouring gentry. His plate, however, consisted only of sixteen spoons, and a few goblets and alepots.

Although the balance in point of comfort is infinitely in favour of modern upholstery, on the other hand, the splendour of our hangings, bed-furniture, and plate, is far inferior to that of earlier periods. Thus, we hear of carved and inlaid bedsteads, with hangings of cloth of gold, paled with white damask and black velvet, and embroidered with coats of arms; blue velvet, powdered with silver lions; black satin with gold roses and escutcheons of arms; tapestry of cloths of gold and silver for hanging on the walls; gold plate enamelled with precious stones; and cloths of gold for covering tables; all which must have exceeded in magnificence any furniture of the present day. These gorgeous moveables descended from generation to generation; and many ancient wills contain bequests and inventories of them. They were, indeed, the wealth of great persons, who could easily convert them into cash, upon pledge, or by sale.—*Domestic Life in England.*

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### RELIANCE.

"He that spared not his own Son, but delivered him up for us all, how shall he not with him also freely give us all things?" Rom. viii. 32. "All things work together for good to them that love God," Rom. viii. 28. Upon the assurance of these Divine promises, my heart may quiet itself in the midst of all the most dark and tumultuous concussions in the world. Is it best for me to be delivered out of them, or to be preserved in or under them? I am under the providence and government of my heavenly Father, who hath said he will not leave me, nor forsake me; who takes more care of me, and bears more love to me than I can bear to my most dutiful child; who can, in a moment, rescue me from the calamity, or infallibly secure me under it; who sees and knows every part of my condition, and has a thousand expedients to preserve or relieve me. On the other side, do I fall in the same common calamity, and sink under it, without any deliverance from it or preservation under it? His will be done; I am sure it is for my good; nay, it is not possible it should be otherwise; for my very death, the worst of worldly evils, will be but a transmission into a state of blessedness and immortality; for, "Blessed are the dead which die in the Lord: they rest from their labours, and their works follow them," Rev. xiv. 13.—*Sir. M. Hale.*

◆

Our High Priest.—How should faith triumph in this! Is not our High Priest in the sanctuary? Is He not clothed with garments of salvation and righteousness! And doth he not bear the names of his people upon his shoulders and upon his breast before the Lord? Thy particular concernments, if thou art a believer, are written upon his heart, with the pen of a diamond, in such lasting letters of loving-kindness as shall never be blotted out, Isa. xlix. 16.—*Mather.*

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Sardine, or Sardius.—A precious stone, blood-red; so called from the city of Sardis, in Lesser Asia, where the best were found. The sardius was the first stone in Aaron's breastplate, Exod. xxviii. 17, xxxix. 10; the sixth in the foundation of the heavenly Jerusalem in John's vision, Rev. xxi. 20; and was among the jewels of the king of Tyre, Ezek. xxviii. 13. The glory of God on the throne which appeared to John in Patmos seemed "like a jasper and sardine," Rev. iv. 3.

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### ERRATUM.

Page 150, line 24, *instead of*, "a mile and a half long," *read*, "fifteen miles and three-quarters."

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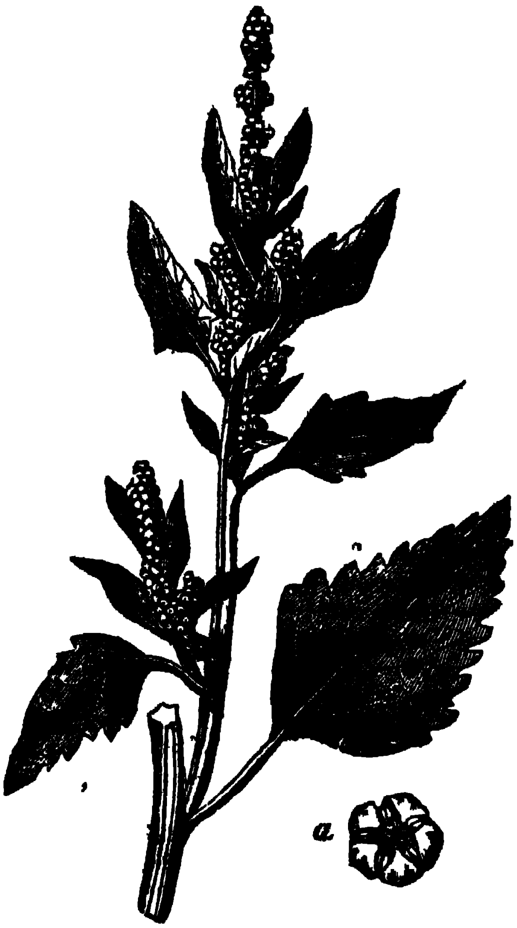

WHITE GOOSEFOOT. (*Chenopodium album.*)
*a*, The flower magnified

## BOTANY.—No. XIV.

### CHENOPODEÆ.

THE plants which we are going to introduce to the attention of the reader, offer little that can attract the observation of a florist, and still less to those who are only engaged by the splendour of colours. But though this order may seem to have few pretensions to beauty or comeliness, and many are regarded as vile and troublesome weeds, in cultivated grounds, yet, to a mind accustomed to consider the several points of correspondence in property, habit, and structure, they are not without their measure of curiosity. That well-known vegetable, the spinage, may serve both as a specimen of their form and utility, while the figure of the white goosefoot will recall to the recollection of the reader one of the most common inmates, or rather intruders, of our garden. That tall blood-red plant, which used to make a conspicuous figure in every cottager's flower border, is also a member of this family. On the seashore, we find in the greatest abundance the sea purslane, which is readily known by its shrubby stem and hoary egg-shaped leaves, in company with the sea orache, distinguished from the former by its herbaceous stem and narrow leaves. Examples, in short, are every where to be met with; and we might say, at a venture, that the weed most prolific upon any dunghill, is one of the chenopodeæ. Another example of this order may be cited in the marsh samphire, which grows in such prodigious quantities wherever the tide ebbs and flows. These plants agree in that part of their habit which makes them of a rank and prolific growth, wherever they find a suitable earth; such probably as contains a portion of alkaline substance, since we find them either on the sea-shore or in the neighbourhood of manured grounds, where matters of this kind abound. We have long been impressed with the idea, that they all contain a certain kind of alkali in combination with their nutritious qualities: this is observed in the glasswort, long known for the alkali it yields; which being used as a flux in melting flint into glass, has imparted to the plant the name of glasswort. In the roots of the beet, chemists a few years ago discovered a portion of sugar, in many respects better than that obtained from the sugar cane. This led to the cultivation o the beet on a large scale in France, for the specific purpose of manufacturing sugar; and so well has the attempt succeeded, that some think it will displace the cane. Even in Cuba, we are told, a preference is given to the beet. Thus we see that a department of the vegetable nature, which at the first glance might awaken but little interest and curiosity in our minds, assumes an importance in the comforts and well-being of life; which, while it reflects credit upon the investigations of man, ascribes praise to Him who has laid up, in every corner of this sublunary creation, something that, by skill and perseverance, may be turned to the advantage of his creatures.

The corolla in these plants is generally wanting, though in some instances the calyx is finely coloured, to make up for its absence. The calyx, in the perfect flowers, is divided into five segments. From a point near the base of each segment, a stamen bearing a yellow anther arises, so that they are generally five in number, to correspond with the divisions of the calyx. In the atriplex, the flowers are of different kinds; in some we find the stamens and divisions of the calyx as we have just described; in others two small leaves, which enclose the seeds, like the two valves of a cockle-shell. Several species of the chenopodium are known in some places by the name of blite, in others goosefoot. There is one sort that grows at the foot of and sometimes upon walls, which may be easily recognised by its strong disagreeable smell, and its small hoary leaves, which are rhomboidal, that is, shaped something like a diamond pane of glass in a cottager's window. This is the chenopodium olidum. A reference to this plant will serve to introduce a remark about the leaves of the chenopodeæ. For, though in some instances, they are egg-shaped, and in others narrow, (linear,) tapering to a point, yet, in general their shape reminds us of mathematical figures: even in the leaves of the spinage, which are puckered as if the nerves had been too short for their purpose, the eye remarks a singularity in their cut or contour at the base. A good deal has been said in commendation of the medical properties of the chenopodeæ, and not perhaps altogether without foundation. An essential oil prepared from the chenopodium anthelminticum, which grows in North America called worm-seed oil, is reputed very useful for the object intimated by its name. In Mexico a tea is made of another species, remarkable for the sweetness of its smell, as the writer, who often gathered it when in that country, can testify. An analysis of this herb (*chenopodium ambrosioides*) shows that it contains, among other principles, gluten, a volatile oil, and a great number of salts. We may take leave of this family by annexing a short list of some of the common specimens of it:

*Beta vulgaris*, common beet.

*Salicornia europea*, marsh samphire.—Which has been divided into three distinct species, by Dr. Smith.

*Chenopodium bonus Henricus*, common English mercury, or wild spinage.

*C. viride*, green goosefoot.—Leaves with round notches. Gardens.

*Atriplex hastata*, wild orache.—Rubbish.

*A. patula*, spear orache.—Both these species are very common, and may be distinguished from each other, by observing, that in the former the stem is flattened, in the latter somewhat four-cornered.—Rubbish.

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### NEWSPAPERS.

BEFORE the invention of newspapers, pilgrims and persons attending fairs were grand sources of conveying intelligence. Blacksmiths' shops, hermitages, &c., were other resorts for this purpose, as well as the mill and market. Our chief nobility had correspondents abroad and in London, on purpose to write letters of news in London, as St. Paul's Cathedral was a great place to stick bills for advertising, as it was also the place for news, which servants were sent there to gather.

In England, the first example that occurs of a newspaper, was a publication printed by order of Queen Elizabeth; three numbers of which are preserved in the British Museum, the earliest containing news of the Spanish armada being seen in the British Channel. From the time of this publication being given up, we find no continued vehicle for political intelligence, with a fixed title, for many years. In the reign of James I. packets of news were published in small square pamphlets, as they were received from abroad; and these occasional pamphlets were subsequently converted into a regular weekly publication, entitled, "The Newes of the present Week." In the time of the Charleses, and during the civil wars, newspapers were multiplied to a great extent; but in 1680, they were prohibited by royal proclamation. The first of the daily papers published in Great Britain, appeared in London, in the early part of the reign of Queen Anne. In the reigns of George I. and II. more than half a dozen journals, almost exclusively devoted to the communication of news, were established in London; but as yet much was wanting to complete the scheme of our present newspapers. At the accession of George III., and for many subsequent years, we find in the papers of the day, neither political discussion, parliamentary intelligence, nor even reports of the proceedings of the courts of law. The debates of parliament were at that time unknown to the people; (except by imperfect accounts of speeches on particular debates, given in the monthly magazines,) the commencement and conclusion of a session were mentioned sometimes in a single paragraph: and, if a member of parliament wished to inform his constituents of what line of conduct he had pursued, he was obliged to correspond with them by letter. Even domestic information was so scantily diffused, that one of the earliest country newspapers, established in the West of England, used to communicate the intelligence from Yorkshire, and other parts of the north, under the head of foreign news.—*Domestic Life in England.*

## INSECTS.—No. XLII.

(*Smelling.*)

(Concluded from page 301.)

As to the organ of smelling, various and conflicting opinions have been entertained. Lehmann supposed that because an insect is usually smaller than what it feeds on, it could make no difference whether it smells with its *head* or its *tail;* but one would think that a flying insect would be more readily directed to its object by *smelling* with the anterior part of its body, than with the posterior; and that a *feeding* one would also find it more convenient in selecting its food. It has been said that smell must be the necessary concomitant of the respiratory openings, and that there can be no smell where the air is not inspired; but smell does not invariably accompany the breathing organs, even in the higher animals; for we breathe with our mouths, but do not smell with them

Some facts may now be stated, that seem to prove that scents are received by some organ in the vicinity of the mouth, and probably connected with the nose. M. P. Huber, desirous of ascertaining the seat of smell in bees, tried the following experiment with that view. Of all ill scents these animals abominate most that of the oil of turpentine. He presented successively to all parts of a bee's body, a hair-pencil saturated with it: but whether he presented it to the abdomen, the trunk, or the head, the animal equally disregarded it. Next, using a very fine hair-pencil, while the bee extended its proboscis, he presented the pencil to it, to the eyes, and to the antennæ, without producing any effect; but when he pointed it near the cavity of the mouth, above the insertion of the proboscis, the creature started back in an instant, quitted its food, clapped its wings, walked about in great agitation, and would have taken flight if the pencil had not been removed. On this it began to act again; but on the experiment being repeated, showed similar signs of discomposure: oil of marjoram produced the same effect, but more promptly and certainly. Bees not engaged in feeding appeared more sensible of the impression of this odour, and at a greater distance; but those engaged in absorbing honey might be touched in every other part, without being disturbed. He seized several of them, forced them to unfold their proboscis, and then stopped their mouth with paste. When this was become sufficiently dry to prevent their getting rid of it, he restored to them their liberty; they appeared not incommoded by being thus gagged, but moved and respired as readily as their companions. He then tempted them with honey, and presented to them, near the mouth, oil of turpentine, and other odours that they usually have an aversion to; but all produced no sensible effect upon them, and they even walked on the pencils saturated with them.

These experiments prove that the organ of scent in bees (and there is no reason to think that other insects do not follow the same law) is in or near the mouth, and above the proboscis. Kirby found, on dissection of the common burying beetle, *necrophorus vespillo*, under the nose, and partly under the space which he called the nostril-piece, a pair of circular pulpy cushions, covered by a membrane, which he considered to be the organs of smell, and which remained distinctly visible in a specimen he had by him more than fifteen years. A similar organ may be discovered in the common water beetle, *dytiscus marginalis*, but with this peculiarity, that it is furnished with a pair of *nipples*.

Some insects discharge offensive odours, it would seem, to annoy and frighten their enemies. A familiar instance of this appears in the large family of bugs, the fœtor of which is always similar, though their food is various. The lady-birds, *coccinellidæ*, emit a similar, but not so offensive an odour. That of the rove-beetle, *staphylinidæ*, is very disagreeable; and some bees have a strong smell of garlic. A small green beetle, *anchornemis prasimus*, is remarkable for its repeated discharges of smoke and noise. But it is not so well known as another, *brachinus crepitans*, whose discharge resembles a pop-gun, accompanied with a sort of smoke, of which it is said to have a bladder sufficiently furnished to fire off twenty shots in succession. Its chief enemy is a beetle, *calasoma inquisitor*, larger than itself, which hunts it without mercy. As it finds it impossible to escape by swiftness of foot, it stops short, and awaits its pursuer; but, just as he is about to seize it, he is saluted with a discharge; and while he is for a moment stupified with surprise, the bombardier, as it is called, endeavours to gain a hiding-place.

[The small insect is, bombardier (*brachinus crepitans*;) the larger, *calosoma inquisitor*.]

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### THE THIEF IN THE CANDLE.

How often do we remember trifling events, while things of much greater importance pass by unheeded! And, again, how often do trifling circumstances bring about consequences of a momentous kind! A spark may set a whole neighbourhood in flames; a murmuring rivulet may become a rushing river; and a wise remark may prove a source of comfort and encouragement to us all our days.

I have never yet forgotten, and I think I never shall forget, while my memory lasts, what I heard Jenny Bridgens say about a "thief in the candle." Jenny Bridgens was the mother of our nurse-maid Nancy, and lived in the country; and often have I wondered, while sitting in her neat cottage, looking on the little garden, and green fields, and the river, and the church on the hill, and the tall elm trees—often have I wondered why every body also, who had the opportunity, did not live in the country as well as Jenny Bridgens.

It certainly does seem, at first sight, very odd that people should coop themselves up, among narrow streets and smoky chimneys, breathing bad air, and seldom stirring from home, when they could live in an airy situation, breathe the fresh gale, and wander at liberty over the green fields; but, then, there are advantages in the town as well as in the country; and, therefore, the best way is to be thankful for the blessings we enjoy, and to endeavour to do our duty in that situation in which it has pleased God to place us.

It was in November that Nancy Bridgens one afternoon set off to see her mother, who, being a widow, lived alone; and I, never being so happy as when in the country, asked leave to go with her. We set off in high spirits, and found plenty of amusement. At one farm-house we found a large flock of white pigeons, and very beautiful indeed did they appear wheeling round and round, their bright and silvery wings relieved by the dark blue sky. Near another house, a flock of geese, grazing on the green by the pond, came hissing and fluttering their wings; and though we drove them away, no sooner did we go forwards, than they came after us again, stretching out their long necks, and cackling, as though they were driving us both before them. Under an old oak tree, three or four large pigs were busily employed in routing about in the grass for acorns, which fell from the tree, being blown down by the wind; and at a sharp turn in the lane, a donkey began to bray in such a manner that I jumped forward to lay hold of Nancy, as much frightened as if it had been the roar of a lion. Even this adventure served us to laugh at directly after; so that, altogether, we were as merry as crickets.

Jenny Bridgens was very glad to see us, and got out her best tea-things to give us a cup of tea; after which she took up her knitting, while Nancy sat reading a tract to her, which she had brought for that purpose. Nancy had nearly finished the tract, when up starts the old lady from her armchair to take hold of the snuffers; for while she had been looking at her knitting, and her daughter at her little book, without their knowing it, there had been a thief in the candle.

That thief in the candle, said Jenny, soon after Nancy had finished her tract, takes me back again many years of my life. It happened, that one rude winter's night, when I had more than common to do with my needle, there was but one candle left in the candle-box; and when I lighted it, thinks I to myself—If I am not in a bit of a bustle, so sure as I am born, my candle will be burnt out before I have finished my work. In about half an hour I left the table, intending to return again in a few minutes, but very foolishly began to do a few trifling jobs in the chimney-corner, which might quite as well have been done at another time. How long I was away from the table I cannot tell, but when I went back to it again, I found there was a thief in the candle. It must have been burning there for some time, in that manner; for one side of the candle, more than half-way down, was melted. What made it worse was, that the wick of it had given way, so that the candle would not stand upright. I tried all manner of contrivances, but all this time the candle was burning, and so much of it had been wasted, that before I had half done my work it began to flicker in the socket of the candlestick.

I was sadly vexed at myself, and while I sat fretting and stewing, in comes my good man, as good-tempered as I ever saw him in my life.

"Jenny," said he, hanging up his hat on the peg by the stair-foot door, "thee hadst better light another candle, or stir up the fire: let us look a little cheerful on this side the door; for it's gloomy enough on the other."

While he said this, in his joking way, the walls of the cottage were one moment lighted up, and the next covered with shadow, for the flickering flame threatened to go out every moment; but when I told him about the thief in the candle, and that the candle-box was empty, he shook his head, and, sitting himself down on the oak chest in the chimney-corner, began to talk to me. "Jenny," says he; and while he spoke, he took up the poker, and made the fire flare up afresh; "Jenny," says he, with a smile on his face, "I am afraid it's no uncommon thing in most houses to have 'a thief in the candle.'"

I felt the colour flush in my face, being more vexed at what he said than I had been before.

"You need not say that, James," says I; "for we have not had a thief in the candle I don't know the day when before."

I began to clear the round deal table, that I might set his supper before him, but all the while I was as snappish as the tongs.

"Jenny," continued my husband—and a better husband never woman had in the world,—"I have heard say life is but a candle, that flares away for a little while, and then sinks into the socket, and goes out. Now I take it, that if our lives are to be looked upon as candles, we have had a pretty many thieves in them in our time."

I was too cross to say any thing; so he went on talking just as he did before. Says he, "When I was a youngster, and played truant, as I too often did on the week-day, and roamed about the country instead of going to the house of God on a sunday, I take it that my days were sadly wasted. I did'nt know it then, but I know it now, that there was a thief in the candle."

Thinks I, you are right enough there, James, but I said nothing. My husband went on thus—

"Then again, where was a more random young fellow in the parish than I was, till God of his mercy taught me better? I could run fast enough to all the wakes round the country, and bawl enough in all the public-houses, losing my time and hurting my constitution; but as to doing my duty in this world, or seeking God's grace to help me to a better, I cared but little. Wasn't this wasting my very life? Wasn't this, think ye, having a thief in the candle?"

What James said began to mollify me, for it went to my very heart, but I didn't interrupt him.

"I can see, Jenny," says he, "that you are a little bit twisted about at what I said about the thief in the candle, but I didn't mean to apply it to you half as much as to myself. When we consider what God has done for us, in giving us health of body and peace of mind, in sending his own Son from heaven to die for us, and in giving us the Bible to instruct us in the way to heaven—when we consider, I say, how good God is to us, and what poor, good-for-nothing, ungodly creatures we are towards him, we ought to try, looking to him for grace, to improve our time more than we do.

"Our candles will soon enough be burning in the socket, and if we busy ourselves about trifles, and neglect doing what ought to be done, we shall find, when we little think about it, that there has been a thief in the candle."

Since that night I have known a deal of sorrow, for my husband has been taken away, and I have been left a poor lonely widow; but the bitter cup has been sweetened with mercy; I have been graciously led to seek and to know more of Him, whom to know is eternal life. My prayer now is, that my days may not be wasted; that my life may be devoted to the glory of the Redeemer, and that no thief may be found in the candle.

Nancy and I left the cottage about seven o'clock, having passed our time very pleasantly. As we walked home together, the bright moon was sailing across the sky, and the white clouds, piled up like hills of snow, were hurried along, one after another, blown by the winds. I cannot remember all that passed in our visit; but I have never yet forgotten, and I think I never shall forget, what Jenny Bridgens said about the "Thief in the Candle."

## PUBLIC WORSHIP ON THE SABBATH-DAY.

ANOTHER method of sabbath sanctification is, by regular attendance at the house of God. Am I to prove this a duty by Scripture? Very remarkable is the connexion of duties, as enjoined in two passages, Lev. xix. 30, and xxvi. 2: "Ye shall keep my sabbaths, and reverence my sanctuary: I am the Lord." It is said of the Saviour, that he went into the synagogue at Nazareth on the sabbath-day, "as his custom was," Luke iv. 16. So in Luke vi. 6, "It came to pass also on another sabbath, that he entered into the synagogue and taught." So again, "And he was teaching in one of the synagogues on the sabbath," Luke xiii. 10. So in the Acts, the apostles at Thessalonica, Acts xvii. 2:—so at Antioch, in Pisidia: "And the next sabbath-day came almost the whole city together to hear the word of God," Acts xiii. 44. And so for our first day sabbath: on this day the Saviour once and again met his assembled disciples, saying, "Peace be unto you," John xx. 19, 20, 26. On this day the disciples were assembled, when the Holy Spirit was given, Acts ii. 1, 2. At Troas, on the first day of the week, the disciples came together to break bread, and Paul preached unto them, Acts xx. 6, 7. On this day the Corinthians were to make their contribution for the poor saints at Jerusalem, 1 Cor. xvi. 2, just as we occasionally make our collections on sundays for schools, and for missions, and the poor. So in the history of the primitive church, Justin Martyr gives this account of the primitive practice of the christians to meet together for Divine worship on the Lord's-day: "On the day which is called sunday, there is an assembly of all those who live either in cities or in the country; and the books of the prophets, or the writings of the apostles, are there read, as long as time will permit. When the reader has done, he who presides in the assembly makes an harangue, in which he admonishes and exhorts us to imitate and practise the fine things we have heard. Then we all rise up with one consent, and send our prayers to God," Apolog. i. c. 87. Tertullian calls the Lord's-day, the holy day of the christian church assemblies and holy worship. We have the testimony of Pliny, the Roman pro-consul in Bithynia, a heathen, and an enemy of christianity, to this practice of the christians to assemble for public worship on this day. "They are accustomed," he says, "to assemble together on a stated day before day-break," (this, I suppose, was because of their persecutors,) "and sing a hymn to Christ as to God, and to bind themselves by a sacrament, not to some crime, but that they will not commit theft, or robbery, or adultery, or false witness, or any crime," Plin. Epist.

Lu. 10. Ep. 97. When with this testimony to the practice of Christ, the apostles, and the primitive church, I join the apostolic injunction, "Not forsaking the assembling of ourselves together, as the manner of some is," Heb. x. 25; and the Saviour's promise, "Where two or three are gathered together in my name, there am I in the midst of them," Matt. xviii. 20; when I further think of the recommendations of the church in all ages, and of the blessedness realized by multitudes of witnesses in public worship:—then, I must say, I marvel at those who, calling themselves christians, yet, with a light excuse, or with no excuse, neglect public worship. Is it not a mark of a lukewarm age, when the weather, which never keeps men of business from going to town, seldom keeps any from parties of pleasure, and scarcely ever keeps us from fulfilling our engagements with man; yet, if unfavourable, invariably thins our congregations? insomuch, that the appearance of our churches might almost serve as a barometer, or test of the state of the weather. But, it is not so, where there is the love of God's house and service wrought into the heart by the Holy Ghost. Then this is the language of the heart,—"How amiable are thy tabernacles, O Lord of hosts! My soul longeth, yea, even fainteth for the courts of the Lord: my heart and my flesh crieth out for the living God," Psalm lxxxiv. 1, 2. Then, this is your frame of mind, when sabbath bells wake up the day: "O God, thou art my God; early will I seek thee: my soul thirsteth for thee, my flesh longeth for thee in a dry and thirsty land, where no water is; to see thy power and thy glory, so as I have seen thee in the sanctuary," Psalm lxiii. 1, 2.—*Hambleton.*

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## RELIGIOUS EMOTION.

TRUE religion is not a matter of mere feeling and strong emotion, but a matter of judgment, and conscience, and practical principle. You must recollect that the minds of men are variously constituted as regards susceptibility of emotion. Some persons are possessed of far livelier feelings than others, and are more easily moved; we see this in the common subjects of life, as well as religion. One man feels as truly the affection of love for his wife and children, as another whose love is more vehement. His love and grief are as sincere and practical, though they are not boisterous and passionate. Passion depends on constitutional temperament, but principle does not. Mere emotion, therefore, whether in religion or other matters, is no test of the genuineness of affection. Your religion is not to be tried by the number of tears you shed, or the degree of terror you feel, or the measure of excitement to which you are wrought up: there may be much of all this where there is not true repentance, and there may be little of it where there is.—*James.*

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## ANTIQUITY OF SHOEING HORSES, &c.

IN the Christian Almanack for this year, a passage from Xenophon is quoted, in which that warrior and statesman recommended a process for hardening the hoofs of horses. No notice is taken of any method of defending the feet from the rebuffs of a craggy road; nor does Pollux, who addressed his work to Commodus, give the least hint of his acquaintance with any method of shoeing, though he follows Xenophon, and cites his directions. It seems from what we can discern of the matter, that if any means to protect the foot was resorted to, it was in cases where the animal was intended only for slow motions, and that to fetter the hoof with any artificial aid, among horses admired for fleetness, would have been regarded as a way to hinder them in displaying their distinguishing qualities of grace, strength, and speed.

Joachim Camerarius, in his Treatise on the Care of Horses, which he published in 1556, boldly asserts that the ancients were not accustomed to shoe their horses. And Guido Pancivallus observes that some are of opinion, because the shoes used in the present day are not seen in the equestrian statues of the ancients, that they were anterior to them. But Polydore Virgil, however, informs us that the Thessalians were the first who protected the feet of the horse with shoes of iron. Catullus, the poet, speaks of iron shoes in such terms, as to demonstrate that they were in common use at his time. And Suetonius tells us that Nero's mules were shod with silver. The above references remove all doubts of the ancients having shod their horses, but afford us little authority to suppose that they fastened them on with nails, as is practised among us; but rather that they plated them round the bottom of their feet, and drew them over their hoofs. Joseph Scaliger, in his note on the above-mentioned passage of Catullus, is induced to be of his opinion, by the Greek name of horse-shoes, which signifies something bound on, and is also applied to shoes or sandals worn by men. These were perhaps artificially fixed to the hoofs, and the fastenings of them concealed under the hairs of the fetlock. With this conjecture the term *induere*, to put on as a garment, used by Pliny in speaking of the mules of Pappœa, the wife of Nero, and the facility of a shoe's being drawn off by sticking in the mud, alluded to by Catullus, is much greater in one plated over the hoof, than in one fastened by nails. Besides, these plated shoes, which covered the entire hoofs, were adapted to make a more glittering appearance than if nailed at the bottom of the feet only; more especially when made of silver or gold. We have no evidence of the practice of nailing on shoes having been known among the ancients, but the illumination of an old manuscript found by Vossius, who has not told us the date of it.

The earliest instance that may be depended upon that occurred to Mr. Rogers, who took some pains in investigating this subject, was in the time of Childeric, king of France, who died A. D. 481. A part of the shoe was found which belonged to the horse that was interred with his master, Childeric. It was made of iron, pierced for nine nails, and was taken up at Tournay, May 27, 1655, with many other things.

Since writing the above, we have seen a passage in Suetonius, which proves that the practice of shoeing mules was so common, that Vespasian exacted a part of the price paid for it. There is a line in Plautus which alludes to this custom, but the sentiment contained in it shows, that the materials commonly used for that purpose were soft, so that the injury inflicted by a kick from that animal was comparatively harmless. Their shoes, then, differed essentially from those used at present among us."

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## MOUNT SINAI.

Mr. Calne writes:—

On the third morning we set out early from the convent for the summit of Mount Sinai, with two Arab guides. The ascent was, for some time, over long and broken flights of stone steps, placed there by the Greeks. The path was often narrow and steep, and wound through lofty masses of rock on each side. In about half an hour, we came to a well of excellent water; a short distance above which is a small ruined chapel. About half-way up, was a verdant and pleasant spot, in the midst of which stood a high and solitary palm, and the rocks rose in a small and wild amphitheatre around. We were not very long now in reaching the summit, which is of limited extent, having two small buildings on it, used formerly by the Greek pilgrims, probably for worship. But Sinai has four summits, and that of Moses stands almost in the middle of the others, and is not visible from below, so that the spot where he received the law must have been hid from the view of the multitudes around; and the smoke and flame, which, Scripture says, enveloped the entire Mount Sinai, must have had the more awful appearance, by reason of its many summits and great extent; and the account delivered gives us reason to imagine that the summit or scene where God appeared was shrouded from the hosts around; as the seventy elders were permitted to behold "the body of heaven in its clearness, the feet of sapphire," &c. But what occasions no small surprise, at first, is the scarcity of plains, valleys, or open places where the children of Israel could have stood conveniently to behold the glory of the Mount. From the summit of Sinai you see only innumerable ranges of rocky mountains. One generally places, in imagination, around Sinai, extensive plains, or sandy deserts, where the camp of the hosts was, where the families of Israel stood at the doors of their tents, and the line was drawn round the mountain, which no one might break through on pain of death. But it is not thus: save the valley by which we approached Sinai, about half a mile wide, and a few miles in length, and a small plain we afterwards passed through, with a rocky hill in the middle, there appear to be few open places around the Mount. We did not, however, examine it on all sides. On putting the question to the superior of the convent, where he imagined the Israelites stood: "Every where," he replied, waving his hands about—"in the ravines, the valleys, as well as the plains."

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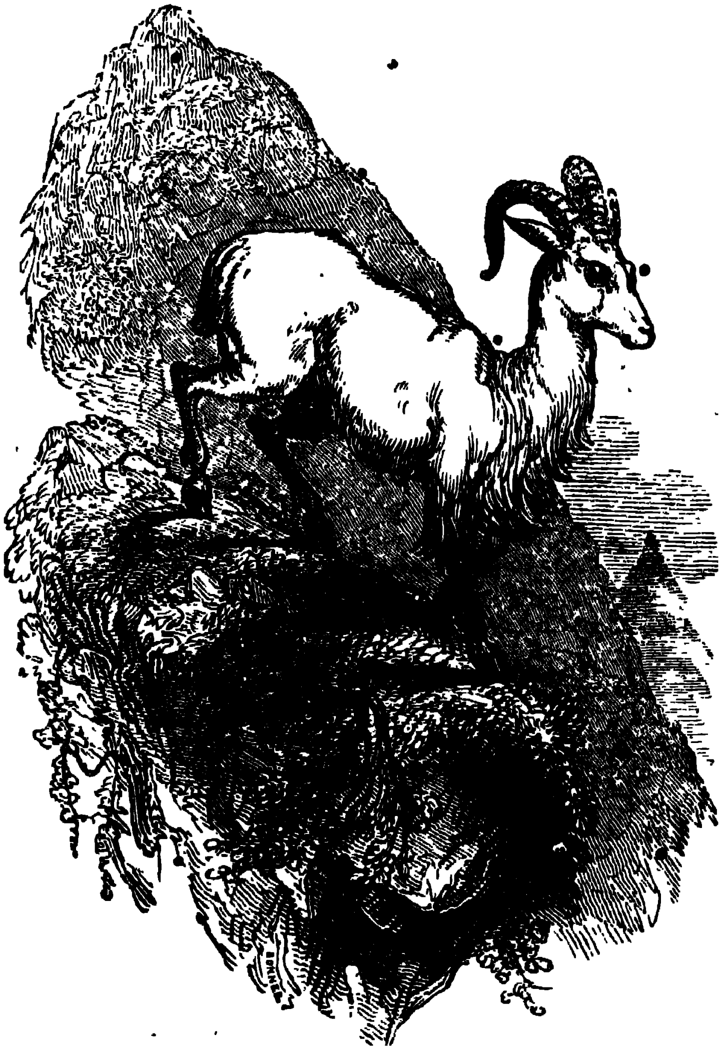

THE AOUDAD.

## THE AOUDAD, OR MOUFLON A MANCHETTES.

*(Ovis tragelaphus.)*

The high mountain tracts and rocky deserts, in every quarter of the globe, are inhabited by various species of mouflons or wild sheep, which have little in common with the reclaimed animal, as it exists under the immediate influence of man. Active, bold, and vigorous, they climb the most precipitous elevations, where they defy the hunter to follow them. Instead of being encumbered with a fleece, they are clad with hair, which, in such as inhabit the warmer latitudes, is short; in most, however, it is coarse, straight, and thickly set. The tail is always short; a circumstance the more remarkable when we consider the enormous size to which this appendage attains in some countries, and the additional but irregular number of the vertebral bones of which, in all the tame breeds, it is composed. The domestic race is generally acknowledged to be descended from the wild mouflon, which inhabits the mountain regions of southern Europe, especially Corsica, Sardinia, Turkey in Europe, and the isles of Greece; when it was reclaimed, or how, is beyond our research. We read in Genesis iv. that Abel was a keeper of sheep, and offered the firstlings of his flock in sacrifice. The argali is another wild species; it inhabits the southern parts of Siberia and Tartary. The high mountains in the northern regions of Canada produce the mountain mouflon, (*ovis montana,*) nor are the alpine districts of India destitute of their peculiar species. Mr. Hodgson, whose researches among the mammalia of Nepal are of the highest value to the naturalist, informs us that he has "ascertained, by living specimens, the existence of two kinds of wild sheep in the Himalayan region; one a variety of the argali, (*ovis ammon,*) the other of *ovis musmon*. The native name of the former is *Ban-bhera;* literally, wild sheep; that of the latter is *Nayour*, or *Na'hoor*."—(See Proceedings of the Zoological Society.)

The species, however, of which we give a figure at the head of the present article, is a native of the rocky deserts of Barbary, and the northern coast of Africa. Its name, in the Arabic dialect of that country, is Aoudad; but from the tufts of hair which hang like ruffles round the fore-knees, it is called by the French "Mouflon a Manchettes."

Unreclaimed from its independent freedom, this native of the desert avoids the sight of man, and the precincts of his dwelling, confining itself to the wild ranges of the hilly country, where it finds a secure asylum. Of all the mouflons it is the rarest, or one of the rarest, in our European museums, and still less frequently has it been brought alive to our quarter of the globe. A female was lately living in the gardens of the Zoological Society, the only example in England, and perhaps in Europe; it has, however, lately died. In its manner, as it is observed in captivity, the aoudad resembles the rest of its genus, being quiet and easily familiarized, but by no means remarkable for intelligence. In its aspect, however, it has that air of native and inwrought independence which strikingly distinguishes between it and the domestic sheep, and which invariably characterizes every wild original of a stock born and bred in subjugation. In proof of this opinion, we need only turn to those animals of our own climate, with which we are well acquainted, both in a state of freedom and captivity. How easily is the wild rabbit to be distinguished from the tame! the one is quick, watchful, rapid, with short oval ears, with small and compact head, and with every limb cleanly turned and vigorous; the other, a captive descendant of a captive race, betrays the effects of thraldom in every movement: a subdued expression of countenance, large ears and head, and large but sluggish limbs at once distinguish it. The same observations will apply to the goose and the duck, which we know both in the tame and wild condition.

No animal exceeds the aoudad in activity; its leaps appear as if performed by magic. Without any previous movement, it will spring perpendicularly to the height of several feet, stand secure on a projection where foot-room is scarcely discernible, throw itself down steep precipices, bound from ledge to ledge, or rock to rock, with fearless confidence and the utmost precision. With regard, however, to the minuter details of its habits and manners nothing is ascertained. It is occasionally shot by the Moors of Tunis, Tripoli, and other places on the same line of coast, and is regarded by the natives as venison. Its food consists of mountain herbage. The general colour is a dull yellowish brown; the horns are stout, ringed, and curved simply backwards. Besides the ruffles at the fore-knees, long coarse hairs hang from the neck and chest. In size this rare and curious animal exceeds a full-grown goat. W.

## MY TONGUE.

How much reason have we to pray for the right use of the tongue! This "little member" is of mighty power, for evil and for good. The apostle James has some most remarkable expressions concerning it, chap. iii. 3—12. No historian can recount the moral havoc which unbridled tongues have wrought.

As we have dedicated to God our whole bodies, as part of our "living sacrifice," so we have especially surrendered to his service this important organ. How shall we use it, so as to glorify him? Let not the reader dismiss this question lightly.

In thinking of the history of the church, and the way in which the kingdom of God has been promoted, from the first day until now, I have been much impressed by the thought, that private conversation has been a powerful instrument. I do not mean to set it as high as the public ordinance of preaching. But after this it holds a high place. The early process of christianity was, as our Saviour expressively taught, like leaven. A little insignificant morsel of sour dough sets the whole mass in fermentation. Let it make but a beginning, no matter in what point, and the work is sure to go on. It is of the very nature of the leaven to do so, and it does not stop till the whole lump has been transformed. So of the kingdom of God—which is not external, but within—which is righteousness, peace, and joy in the Holy Ghost. Let one man really come under this influence of the kingdom; let it really come within him, and his heart is a centre from which a thousand other hearts are to be affected. How? Out of the abundance of the heart the mouth speaketh. This one believer, having a heart full of faith and love, will speak to his neighbour. The opinions of mankind are very much made up of what one man says to his neighbour. A good word is a morsel of leaven in the lump. The speaker may mean little; but he drops a truth; and this truth works after he is gone. The speaker may never know it, but the work goes on. He may go far away, but the operation continues. He may die and go to heaven, but his works follow him. From one to another, from neighbourhood to neighbourhood, yea, from generation to generation, the good leaven may spread in its influence. Therefore it may not be impossible that words dropped by the reformers are not lost to this day in their influence.

Most professors of religion are negligent with respect to the tongue. Some are so filled with the world, that they speak only of the world. Some follow the fashion of the world, and it is the fashion of the world never to speak of Christ. Some are ashamed to speak of divine things. Some are afraid to honour their Master with their lips. Let me humbly ask the reader to consider the following rules:

1. I will endeavour to use my tongue for the glory of Christ.

2. I will endeavour to say something worth remembering, and something good for the soul, in every company.

3. I will endeavour to say something for my Master to every individual with whom I converse; unless I see it to be more plainly my duty to be silent.

4. I will endeavour to find and make opportunities of speaking for God.

5. I will ask the grace of God to prepare the way, to direct, and to bless, in all these endeavours. N—R.

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## BOTANY.—No. XV.

### POLYGONEÆ.

A TYPE of this order may be sought for in the *polygonum fagopyrum* or buckwheat, with which most persons are familiar, as it is often cultivated by farmers as fodder for their cattle; and cannot fail to interest the eye of the passenger by the beautiful livery in which it adorns the field, and by the swarms of the winged tribe that it attracts to feed on the honey of its flowers. On the margin of every pool, at the bottom of ditches dry in summer, or wherever moisture lodges, may be found the spotted snakeweed, known by its red spike of flowers, and its spotted leaves. In its company, may also be usually seen the water-pepper; distinguished from the former by its thin flowered, nodding spike, and by growing in larger quantities. If we cast our eyes upon the still surface of a pond, in some secluded spot where limpid waters are flowing, a shoal of floating leaves, garnished here and there with a spike of red flowers, may sometimes be descried: this is the *polygonum amphibium*, or narrow-leaved pond-weed. If in passing through a corn-field, we examine the straw, we shall often meet with the *polygonum convolvulus*, or black bindweed, known by its delicate twining stem, little pink flowers, and its elegant heart-shaped leaves. On every pathway we find the knotgrass, or *polygonum aviculare*, the seeds of which are very grateful to birds, and are often eaten by boys. Any of these species just cited, will serve as examples to illustrate our notion of the family before us. A little examination will show, that the flower consists of a coloured calyx, divided into several segments, bearing the stamens from its base; that the germen is simple, either naked or covered with the permanent calyx, and superior in reference to the flower. The stigmas are several. If after poring a few moments over one of the species just enumerated, we turn to the dock, we shall be interested by the similarity between them. First, we perceive that the stamens proceed from the same situation, that their number is between five and ten, and that the calyx invests the naked seed, which is surmounted by three stigmas. If the flowers be too small for patience nicely to scrutinize, a very obvious similitude will be easily perceived in a filmy appendage at the base of the leaves, which is called the stipula. Two species of dock are commonly seen growing on road-sides and among rubbish: the curled dock, which has long lance-shaped leaf curled at the edges; and each leaf of the calyx with a red head upon it; and the broad-leaved dock, which has long narrow teeth upon edges of the calyx, and only one with a head.

The last species is a very troublesome weed to farmers, from the vivacious nature of the root, which nothing but fire can destroy. It seems that several species of the dock are useful in disorders of the external surface, either taken as an infusion or applied to the part affected. It is not improbable that the herb ointments applied by some old ladies to sores in the country, are mainly composed of some species of this genus. An infusion of the *rumex patientia*, or herb patience, is copiously used in the hospitals in France, as a drink in divers disorders that result from an ill habit of body. The last we shall make a descriptive allusion to, shall be the *rheum undulatum*, or rhubarb of domestic cookery, the leaf and stalks of which are made into agreeable tarts, ere the highly valued gooseberry is ripe for use. When apprised of it, the reader will not fail to recognise a strong resemblance between the rhubarb and the dock; and this relationship is brought within a closer compass, when we observe that the acidity of the sorrel (*rumex acetosa*) and that of the rhubarb are owing to the presence of oxalic acid. Not only among the splendid and august parts of creation, are the wisdom and goodness of the Creator displayed; but even among objects of humbler port, he incites our curiosity by the harmonies of structure and property, and rewards our investigations with some discovery that proves conducive to the well-being of man.

## WEYER'S CAVE, IN NORTH AMERICA.

Weyer's Cave is found in a ridge of limestone hills, running parallel with the Blue Ridge. In going to it you pass by Madison's Cave, which was once an object of much interest, but is now neglected, from the greater attractions of the one we are about to explore. You ascend the side of the hill by a zig-zag path of about 150 yards long, and then find yourself opposite a wooden door, which is the entrance, and having a bench, on which you rest, to get cool, or to prepare otherwise for the ingress. Having passed the door, you find yourself in a small cave, which may be regarded as a lobby to the whole apartments. With raised expectations, you look about you, by the aid of the daylight, which is struggling to enter, for some openings more considerable. All that you see, however, is the mouth of a dark recess about four feet square; and you are told this is your passage onward. You have no alternative, but to double yourself up in the smallest possible dimensions, and move along, after the lights of your guide, as well as you may, by the assistance of your hands.

Having scrambled along for about twenty-five feet, you come into some larger openings, which allow you the free use of your person. You look upward and around you, and find yourself surrounded by the most grotesque figures, formed, through ages, by the percolation of the waters through the heavy arches of rock-work over your head; while the eye, glancing onward, catches the dim and distant glimmer of the lights; some in the deeps below, and some in the galleries above. On quitting these smaller rooms and galleries, you enter an ascending passage, of easy access; and, on coming to its extremity, you see the opening of a large cavern spread before you, and the commencement of some steps, by which you are to descend. Your care is engaged in getting safely down; but when you have obtained your standing on the floor, you are delighted to find yourself in a large cavern, of irregular formation, and full of wild beauty. It is about thirty by fifty feet, and is called Solomon's Temple. The incrustations become finer here. At your right hand, they hang just like a sheet of water, that had been frozen as it fell. There they rise before you in a beautiful stalactitic pillar; and yonder they compose an elevated seat, surrounded by sparry pinnacles, which sparkle beautifully in the light The one is called Solomon's Throne, and the other his Pillar.

On leaving the Temple you enter another room, more irregular, but more beautiful. Besides having ornaments in common, it spreads over you a roof of most admirable and singular formation It is entirely covered with stalactites, which are suspended from it like inverted pinnacles. They are of the finest material, and are most beautifully shaped and embossed.

You now make an ascent of several feet, and move along a passage, and through two or three lobbies, and come to what is called the Twin-room, and find your way is just on the verge of a dark cavern, which is yawning at your feet, and is named the Devil's Oven. A descent is now made of some difficulty, from an elevation of about forty feet; and you enter a large room, which is called the Tan-yard. This, like some of the rest, is an absurd name; but it has been adopted from the force of association. There are in the rocky floor of this room large cavities which may be thought to resemble the tan-pits; and from the ceiling are suspended large sheets of beautiful stalactites, which resemble the tanner's hides. You advance to an upper floor in this room, which has chiefly one ornament, and that is sufficient. There is, extending along the room, and from roof to floor, an immense sheet of the finest stalactite. When it is struck with the hand, it emits deep and mellow sounds, like those of a muffled drum, and it is called the Drum-room.

You now rise by some natural steps to a platform, which you have again to descend, and then find yourself in what is named the Ball-room. It is a handsome and large apartment, about 100 feet long, 36 wide, and 26 high. Its floor is so level as to admit of dancing, and it has been used for this purpose. There is in the centre of it a large calcareous deposite, which has received the name of Paganini's Statue: the whole room is relieved by grotesque concretions; and the effect of the lights burning at every elevation, and leaving hidden more than they reveal, is exceedingly fine.

From the Ball-room you make an ascent of 40 feet. This is named Frenchman's Hill; from the circumstance that a visitor from France, with his guide, had their lights extinguished near this spot. Happily the guide had such an accurate knowledge of the locality, that, after much difficulty, they got safely back, a distance of more than 500 feet. You wind your way through passages, and make a descent of nearly thirty feet, by what is known as Jacob's Ladder, with pits and caverns opening about you, and come into the Senate Chamber, and afterwards to Congress Hall. The last is a fine room, very like the Ball-room, but with an uneven floor. As you leave it, an immense cavern spreads itself before you, with the dim lights gleaming over its mouth, so as to make its unfathomed darkness horrible. You gaze on it with amazement, and instinctively long to pass on, lest it should drink you up. It has received the name of Infernal Regions. By another lobby, and another descent, you enter Washington Hall. This is the most wonderful opening of the whole. It is 250 feet long, and 33 feet high. There is a fine sheet of rock-work running up the centre of this room, and giving it the aspect of two separate and noble galleries, till you look above, where you observe the partition rises only 20 feet towards the roof, and leaves the fine arch expanding over your head untouched. There is a beautiful concretion here standing out in the room, which certainly has the form and drapery of a gigantic statue; it bears the name of the Nation's Hero, and the whole place is filled with those projections; appearances which excite the imagination by suggesting resemblances, and leaving them unfinished. The general effect, too, was, perhaps, indescribable. The fine perspective of this room, four times the length of an ordinary church; the numerous tapers, when near you, so encumbered by deep shadows as to give only a dim religious light, and when at a distance, appearing in their various attitudes like twinkling stars on a deep dark heaven; the amazing vaulted roof spread over you, with its carved and knotted surface, to which the streaming lights below in vain endeavoured to convey their radiance; together with the impression that you had made so deep an entrance, and were so entirely cut off from the living world and ordinary things, produces an effect which, perhaps, the mind can receive but once, and will retain for ever.

On leaving these striking apartments, you pass through a passage in which is standing some grand formation, named Cleopatra's Needle and the Pyramids, and then enter a room called the Church. The appearances in this instance suggest the name. It has about the dimensions of a church, and has an elevation of about 50 feet. There is at one end an elevated recess, which has the air of a gallery. At the back of this gallery there are a great number of pendent stalactites, of an unusual size and beauty. They are as large as the pipes of a full-sized organ, and are ranged similarly. They emit, when struck, mellow sounds of various keys; and if a stick is run over them, as we run the finger over musical glasses, they make pleasant music. There is nothing forced in giving this instrument the appellation of organ; it is one of the best that nature ever made; and the most remarkable that I ever beheld. At the other extremity there rises from the ground (not stuck on a roof, as we frequently see) a beautiful spire of considerable height; and this is the steeple.

You pass by the steeple, and come into an apartment, which has the name of the Dining-room. It has similar dimensions to the church; and on its left side there is a continued elevation, resembling a table. You now enter an immense gallery about 10 feet wide, and some 121 feet long, and from 80 to 100 feet high. You turn aside to visit a small apartment, but of exquisite beauty. Here the most singular sparry concretions hang pendent from the roof, while an equal number are growing up from the ground in several degrees of progress, many of them meeting in the centre and becoming one. Winding passages are left amongst them, which make a sort of labyrinth; and as they are semi-pellucid, the passing of the lights through the several alleys, has a very singular effect. This has the name of the Garden of Eden.

You return to the Dining-room, and pass by a dark opening at your feet, which is the mouth of a cavern, into which the foot of man has never been. It can only be explored by rope ladders; and it is supposed, though I think without sufficient reason, to be charged with mephitic gases, fatal to life. You may now make an ascent of some 50 feet, if your nerves allow, and your reward will be adequate to your pains. You must climb over the face of the rock, which has nearly a perpendicular pitch, and you will then find yourself on an elevated platform; and surrounded by loop-holes and striking figures. You may now look down from your eminence, which is the Giant's Causeway, into the large illuminated rooms you have left, and perhaps see a small party moving over the floors in misty shadow. Here stands out in relief before you, and on the very verge of the platform, a fine groupe of stalagmites, white as alabaster, and suggesting to the fancy the figures of a small party of horse moving over high and dangerous precipices. They are Buonaparte and his Guards. There is a fine arch expanding before you over the scene below; you may, with caution, ascend on its head, and by this means gain a more commanding view of the objects so far beneath you.

But we must hasten on When you have made your descent to the ordinary level, and move on your returning course, you pass by an enormous and most beautiful concretion. It is a tower, about thirty feet each way at the base; and rising in diminished squares to the height of thirty feet. It is a stalagmite; nearly as white and clear as alabaster, and dazzles you by its capacity to reflect lights.

You pass, also, some fine springs, at which you may refresh yourself on the way. There is one I must distinguish before we leave. You ascend, in getting to it, a steep of twelve feet, by a ladder, and then, by a little hard climbing, attain to the end of the recess, and stand before what is named the Source of the Nile. It is a fine transparent spring, and is very remarkable for being covered with a thin pellicle of stalagmite. It is strong enough to bear you; and has a hole cut in the centre, which gives you access to the water.

I hope you will not think you have been detained too long on this spectacle. My regret is, that I have only described one-half of what it unfolds, and that with haste and imperfection. It is, in my judgment, one of the great natural wonders of this New World; and for its eminence in its own class, deserves to be ranked with the Natural Bridge and Niagara, while it is far less known than either. Its dimensions, by the most direct course, are more than 1,600 feet; and by the more winding paths, twice that length; and its objects are remarkable for their variety, formation, and beauty. In both respects it will, I think, compare, without injury to itself, with the celebrated Grotto of Antiparos.

For myself, I acknowledge the spectacle to have been most interesting; but, to be so, it must be illuminated, as on this occasion. I had thought that this circumstance might give to the whole a toyish effect; but the influence of 2000 or 3000 lights on these immense caverns is only such as to reveal the objects, without disturbing the solemn and sublime obscurity which sleeps on every thing. Scarcely any scenes can awaken so many passions at once, and so deeply. Curiosity, apprehension, terror, surprise, admiration, and delight, by turns, and together, arrest and possess you. I have had before, from other objects, one simple impression made with greater power: but I never had so many impressions made, and with so much power before. If the interesting and the awful are the elements of the sublime, here sublimity reigns, as in her own domain, in darkness, silence, and deeps profound.—*Reed and Matheson's Visit to the American Churches.*

### THE MANNER OF KNOWING.

The difference between believers and unbelievers as to knowledge, is not as much in the matter of their knowledge, as in the manner of knowing. Unbelievers, some of them, may know more and be able to say more of God, his perfections and will, than many believers; but they know nothing as they ought, nothing in a right manner, nothing spiritually and savingly, nothing with a holy, heavenly light. The excellency of a believer is, not that he hath a large apprehension of things, but that what he doth apprehend, which may perhaps be very little, he sees it in the light of the Spirit of God, in a saving, soul-transforming light: and this is that which gives us communion with God, and not prying thoughts, or curious raised notions.—*Owen.*

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### SPIRIT DRINKING.

Among other destructive vices, spirit drinking is pre-eminently fatal. It impairs the health of its victim, extracting the colour from his cheek, and stealing the vigour from his limbs. It makes him despondent, delirious, insane. By the waste of his money, the consumption of his time, the destruction of his energies, and the ruin of his character, it conducts him, by a sure road, to destitution. Thus it robs his house of its furniture, his children of their food; and, inspiring him with ferocious malice against the unhappy mother who complains of his unnatural selfishness, thus tears up by the root the last flower of domestic happiness.

Whether this vice is more or less prevalent in London than formerly, I do not know; but it prevails sufficiently to do incalculable mischief to the population. The number of public-houses and gin-shops in the metropolis is 4073, besides 1182 beer-shops, and great numbers of coffee-shops, many of which are said to be, at present, worse than the worst public-houses, as schools of profligacy. Hence we may judge of the numbers infected. Not long since, the following numbers were observed to enter two principal shops, one in Holborn and the other in Whitechapel, in one day:—

Holborn shop, 2880 men, 1855 women, 289 children; total 5024.

Whitechapel shop, 3146 men, 2186 women, 686 children; total 6018.

The following numbers were also observed to enter fourteen principal gin-shops in one week: —

142,453 men, 108,593 women, 18,391 children; total 269,437.

As it is improbable that the observers recognised individuals who entered more than once, I will suppose that these were the whole number of visits to the shops in that week, and that each person visited it once a day: then the number of persons visiting those shops would be 269,437 divided by 7, or 38,491.

Thirty-eight thousand four hundred and ninety-one persons, the women and children being nearly equal to the men, habitually attend these fourteen shops; how many, then, must contribute to the support of the other 4059 shops with which the metropolis is disgraced! Either immense multitudes must be infected with this vice, or else, those who are infected must be ruinously devoted to its indulgence. It is well known how it grows upon those who yield to it; and some idea of the degree in which it prevails in London may be formed from the fact, that above 23,000 persons are annually taken up by the police, for drunkenness alone. The numbers taken up by the police for drunkenness in the years 1831, 1832, and 1833, were as follow:—

1831; 19,748 males, 11,605 females, total 31,053.

1832; 20,304 males, 12,332 females, total 32,636.

1833; 18,268 males, 11,612 females, total 29,880.

A circumstance which renders this amount of drunkenness still more appalling is, that it, for the most part, is so indulged as that it excludes the drunkard from all the means of grace on the sabbath-day. Labourers and artizans, being paid their wages on saturday, devote that evening to revelry. The public-houses in Lambeth, Spitalfields, Whitechapel, St. Giles's, and Covent Garden, are filled with persons drinking, till a late hour on saturday night. Early on sunday morning they fill again, (some having been open all night;) and just before eleven o'clock turn out their disgusting herds, to roll along the streets, or lie in the gutter till they are picked up by the police. Saturday night and sunday morning, in those low neighbourhoods, are the scenes of drunken frays and revolting vice. Men fight with men, and women with women, till the clothes are torn from their backs; defy and insult the police; and then spend their sabbaths in the watch-house.—*B. W. Noel.*

## SLAVERY OF THE FEUDAL SYSTEM.*

Under the Anglo-Saxons, parents are known to have exposed their children for sale in the market-place, like cattle; and an old historian accuses the Anglo-Saxon nobility of selling their female servants as slaves to foreigners: thus proving the practice of slavery in England many centuries since.

All landed estates amongst the Anglo-Saxons were cultivated by great numbers of slaves, who were not so much the property of the master, as, so to speak, that of the soil; the two being bought and sold together. There are some instances of freemen selling themselves for slaves; and, on the occasion of a famine in England, many persons, having no means of subsistence, sold themselves into slavery. Theft was in some cases punished with loss of liberty; but the great supply of slaves arose from the capture of prisoners of war. A father had the power of selling his son into slavery for seven years, but for no longer. There were not only slaves who tilled the land, but those who took charge of the household affairs of their lord. Nevertheless, all slaves were allowed to redeem themselves, on payment of a sum of money; after which each enjoyed all the privileges of a freeman. Guthred, for example, rose from a slave to fill the throne of Northumberland.

The lords possessed extraordinary power over their vassals: for, Aubrey tells us, that at Tormarton, in Gloucestershire, anciently the seat of the Rivers family, is a dungeon fourteen feet deep: about four feet high are iron rings, fastened to the wall, which were probably to tie offending vassals to; as all lords of manors had this power over their vassals, and had all of them, no doubt, such places for their punishment. Aubrey adds: "it is well known that all castles had dungeons; and so, I believe, had monasteries; for they had often within themselves, power of life and death." In latter times, even the porter's lodge had a dungeon, and was a place of smaller punishment for the servants and dependants of the great.

* What is called in history the feudal system, which was at its greatest height under William the Conqueror, was throughout a scheme of slavery. It was, indeed, a system of government and landed property, under which tenants, or vassals, as they were called, held land upon condition of certain services to the lords, or followers of the Norman Conqueror, among whom he parcelled out the whole of Britain. The land so held was called a fee, feud, or, fief; hence the conditions were named the feudal system. The occupiers were tenants of the land and vassals of the lord. But the vassal could not alienate or dispose of such possessions, without the consent of the lord, upon the performance of certain oppressive duties. —*Domestic Life in England.*

## THE PORPOISE.

If we examine the structure of a porpoise's head, we find its cavities capable of great distention, and such that he can fill them at pleasure with air or with water, according as he would mount, float, or sink. By closing the blow-hole, he shuts out the water; by letting in the water, he can sink; by blowing from the lungs against the cavities, he can force out the water, and fill the hollows with air, in order to rise.

No one can doubt, that such facts afford direct evidence of an apt contrivance directed towards a specific object, and adopted by some Power thoroughly acquainted with the laws of hydrostatics, as well as perfectly skilful in workmanship. —*Lord Brougham.*

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The Covenant of Grace.—If any thing ought to be accounted worthy of the most attentive consideration, it is indeed the covenant of grace. Here a way is shown unto a better paradise than the earthly, and to a more certain and more stable happiness than that from which Adam fell. Here new hopes shine upon ruined mortals, which by so much ought the more to be acceptable, by how much it came more unexpected. Here conditions are offered, to which eternal life is annexed; conditions not again by us to be performed, which would cause the mind to despond; but by Him who departed not this life, before He had truly said, "It is finished," Rom. x. 4.—*Witsius.*

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God's Time.—One minute sooner than God's time would not be his people's mercy, Exod. xii. 41, Psalm xxxi. 15.—*Fleming.*

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ZEBRA SPIDER, AND ITS NEST.

### SPIDERS' EGGS.

THE purposes for which an all-wise Providence has bestowed on spiders the power of spinning silk from their bodies are very various. By this they can construct for themselves a place of concealment from their enemies, or sheltering canopy from rain and storms, and nets and snares to entrap the insect-prey upon which they feed, besides what we shall now advert to, the covering which they manufacture for their eggs, and which may be called a nest, is a very curious and interesting object of observation for those who delight to trace the working of providential wisdom among the minor beings of creation.

Looking at the size of a spider, and at that of the eggs which it lays, it appears almost incomprehensible how they could be contained in so small a body; but by observing them more closely it may be discovered that they have not, like the eggs of birds, a hard shell, being, on the contrary, soft and compressive. Accordingly, before they are laid, they lie in the egg-bag, (*ovarium*) within the spider's body, squeezed together in a flat manner, and only come into a globular form after they are laid, in consequence of the equal pressure of the air on every side, in the same way as we see dew drops and globules of quicksilver formed from the same cause.

The eggs of spiders, it is worthy of remark, are in most cases, though not always, placed in a roundish ball; and as there is nothing in creation without some good reason, if we can discover it, we may infer that this form is designed to economize the materials of the silken web, which the mother spins around them by way of protection. Whether we are right or not in this conjecture, there can be no question as to the manner in which the ball is shaped, as we have often observed the process. The mother-spider, in such cases, uses her own body as a gauge to measure her work, in the same way as a bird uses its body to gauge the size and form of its nest. The spider first spreads a thin coating of silk as a foundation, taking care to have it circular by turning round its body during the process. It then, in the same manner, spins a raised border round this, till it takes the form of a cup; and at this stage of the work it begins to lay its eggs in the cup, not only filling it with these up to the brim, but piling them up above it into a rounded heap, as high as the cup is deep. Here, then, is a cup full of eggs, the under half covered and protected by the silken sides of the cup, but the upper still bare and exposed to the air and the cold. It is now the spider's task to cover these, and the process is similar to the preceding; that is, she weaves a thick web of silk all round them, and instead of a cup-shaped nest, like some birds, the whole eggs are enclosed in a ball, much larger than the body of the spider that constructed it.

There is a singular mechanism for the purpose of placing the eggs in a proper position. The eggs are excluded from a cavity just behind the breast. Here there is an organ placed somewhat in form of a hook or bent spatula, which the spider can move in such a manner as to direct every individual egg it lays to the exact spot in the next cup where it wishes it to be placed. The sense of touch in this organ must, of course, be very acute, as by touch it must be wholly guided; for its eyes, though eight in number, and very piercing, are situated on the upper part of the head, and cannot be brought within sight of the nest. J. R.

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## TRAVELLING EXPENSES IN FORMER TIMES.

Of travelling expenses in the thirteenth century, a roll is in existence, and is too interesting to be passed over. It contains a steward's accompts of the daily expenses of a person of rank, in the reign of Edward I., on a journey from Oxford to Canterbury, and during his sojourn in London, about the year 1289; while the record throws much light upon the mode of our ancestors' living, at a period concerning which we have very few similar memorials. One day's expenses are as follow:—"In bread, sixpence; two gallons of wine, a gift of hospitality from the rector of Berton; item in bread, sixpence; two gallons of wine, a gift of hospitality from the rector of Mistern; beer, sixpence; herrings, three-pence; stockfish, four-pence; porpoise and fish, four-pence; perch and roach, seven-pence; large eels, seven-pence; vegetables, three-pence farthing; figs and raisins, two-pence; fuel, five-pence; a bed for two nights, two-pence: hay for seven horses, seven-pence; a bushel of oats, twenty-pence; apples, a halfpenny; sum, six shillings and eight-pence halfpenny." The most expensive day in the roll is on a sunday, "in expenses of my lord at Westminster, when he held a breakfast there for knights, clerks, and esquires:—bread, two shillings; beer, twelve-pence; wine, three shillings and eight-pence; half a salmon for the standard, with the chine, three shillings and eight-pence; a fresh conger eel, three shillings; three fat pikes, five fat eels, and twenty-seven fat roaches, twelve shillings and four-pence; half a hundred lamprons, twelve-pence; oysters, three-pence; vegetables, two-pence; the hire of a boy to prepare the breakfast, one penny; fare to Westminster, one penny; a basket, one penny farthing. On the same day, at the inn: bread, five-pence farthing; beer from the store; two gallons of beer for the boys, two-pence; fish from the store; candles, a halfpenny; fuel, a halfpenny; hay bought, five-pence three farthings; straw, sixpence; two bushels of oats, eight-pence; two pair of shoes for my lord, twelve-pence; sum, thirty shillings and three-pence farthing."—*Domestic Life in England.*

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## HOW TO BEGIN.

Reader, do you wish, or do you think you wish, to become a christian?

A great many persons *think* they wish to enter God's service, when they really do not. Ascertain first, then, whether you desire to serve God, by considering what that service is.

1. It will, in the first place, require you to give up at once every thing which he has forbidden. There are certain known and open sins condemned by his moral law, which must be entirely and for ever abandoned, or you cannot be his. One man allows himself certain practices in his dealings with others, which his conscience secretly tells him are wrong, and he is unwilling to give them up. His heart clings to them, and they stand, like an impassable wall, between his soul and salvation. Another is engaged in a calling which is ruinous to the souls and bodies of his fellow-men. A third violates the sabbath, by bringing into it secretly his business or his pleasure; and a fourth indulges in habits which his own conscience, and the word of God, distinctly condemn. They all, perhaps, think they wish to become christians, and often say that they do not know how to begin! They read the Bible, and

perhaps offer cold and formal prayers, and even take their place among religious inquirers; but the way is dark before them. They find no peace or happiness in piety; but it is just because they are not willing to renounce the pleasures of sin. He, therefore, who thinks he wishes to give himself up to God, should look carefully within, examine faithfully his conduct and character, and see whether there is nothing which he knows is wrong, and which he is, nevertheless, unwilling to abandon: if there is, it is vain to think that he wishes to become a christian. He prefers sin.

2. It is not only necessary to renounce what God has forbidden, but to devote yourself to the work of doing what he requires. A large portion of the human race seem to have no idea of the design with which they were created. Hence they seem fully satisfied with themselves, if they are not doing any thing which can be shown to be positively in itself wrong. They seem never to think of the guilt of neglecting the work which God has placed them here to do. A man, for example, will give himself up entirely to the pursuit of pleasure. His whole time is employed in finding or making enjoyments for himself. He is careful, perhaps, not to fall into any immorality, and then he says, What harm can there be in a little innocent amusement? He thinks those are fanatical who object to such a life as he leads. Mistaken man! God has placed you in this world, not to amuse yourself, but to do work for him; and the charge against you is not merely the intrinsic wickedness of what you do, but also the guilt of neglecting what God has commanded you to do.

A husbandman employs labourers to work in his vineyard, but instead of entering faithfully upon their work, they sit down upon a green bank, and spend their hours in idleness, or else engage together in some athletic game. One, more faithful than the rest, attends to his duty, and perhaps points the rest, occasionally, to their employer's neglected work, and warns them of his displeasure.

"What a narrow-minded, fanatical fellow is this!" says one in reply. "What harm can there be in a little innocent enjoyment?"

"None at all," answers another. "Our employer is a benevolent man. His object is our happiness, and he wishes us to use the opportunities for enjoyment which he puts into our hands. He cannot wish to interrupt our pleasures."

So saying, they turn away from their faithful companion, and give themselves up again to their pleasures. Other labourers see the example of idleness and unfaithfulness which they set, and follow it; and they quiet all their apprehensions as to the future, by persuading themselves that their employer is too merciful a man even to dismiss them from his service, and thus bring them and their innocent families to want and suffering.

It is just so with men. God stations them in this world to accomplish certain purposes, which he plainly marks out. We are commanded to devote our time, and all our powers, to the work of promoting holiness and happiness all around us, and of preparing ourselves and others for our final home. One man, neglecting these objects altogether, devotes himself entirely to the work of acquiring property, simply for the pleasure of feeling and saying he possesses it. In this work he is entirely absorbed. He rises early and lies down late; he is industrious, and frugal, and watchful; but the object of all is simply the increasing of his stores. He spends his life in this work, never thinking of what God has given him to do in this world; or if he thinks of it, he has no intention of doing it. The unhappy man must find at last, that though there may be, in itself, no sin in acquiring property, there is great sin in spending a whole life in the entire neglect of the real business which God had assigned him.

If, then, you think you desire to become a christian, consider whether you are willing to do, in this world, the work which God has assigned to you, or whether you prefer employing yourself about some other. It is in vain to say that other employment is innocent in itself. You cannot be God's servant without being willing to do his work. And what is that work? Why, that you should first study to improve your own character in holiness, and that you should endeavour to acquire and to preserve property and influence as a means of doing good to others; of promoting the prosperity, and happiness, and welfare of your neighbours, and the community in which you dwell; relieving the sick and the suffering, and advancing the cause of universal knowledge, piety, and happiness. Are you willing to engage in this work? If not, do not vainly imagine you wish to be a christian.

3. One thing more is necessary. I have said you must be willing to abandon all sinful practices, and to engage at once in God's work. You must also be willing that your adherence to the cause of God and religion should be openly known. Many persons wish to come and make secret peace with God, because pride remonstrates against an open admission of his claims. But this will not do. You cannot in this way render your Maker that efficient service which his cause requires; and besides, since you have been openly in the wrong, it is right for him to insist upon your openly admitting it, and making your repentance as public as your sin.

Now, these three things are most manifestly implied in entering God's service. To pretend to choose his service without being willing to do these things, is plainly absurd. Any one, then, can easily tell whether he does or does not wish to enter this service. Are you ready to abandon at once all known sin, and to devote yourself to the service of God, and to do it openly, so that your return to duty may be known? If you are willing, the return is easy. The great atonement for all your past sins has been made, and the way is entirely open for your coming at once to God, through the great Mediator, and surrendering soul and body, time, talents, influence, and property, to his work. He will assuredly accept the surrender.

It must be made deliberately and solemnly. All its validity depends upon its being sincere and honest; but the more formal it is in manner the better. The first great covenant which God made with the Hebrews, was executed in writing, and deposited with solemn ceremony in a gilded box, which was carried with them in their wanderings for many years. So let the christian now make his covenant with God." Let it be a deliberate and formal and solemn act. If he utters aloud, in his hour of solitude, the words of consecration, the work will be more effectually done, than if he breathes them in silence; and to reduce them to writing, and sign them with his name, and then read them solemnly before God, some think will be better still. They urge that it should be done deliberately, as a most solemn and binding act. God will be a witness, when you desire him to be your perpetual protector and friend. Such a covenant might be as follows:—

"Oh! my Maker, I will henceforth have thee for my Master, and I will be thy servant. I stop here, in my neglect of thy commands. I stop here, in my life of irreligion and selfish pursuit of worldly good. I will now begin to serve thee. This body is thine; thou hast created it, and preserved it, and hast given to it all its powers. I have used it thus far for my own purposes, but henceforth I will use it for thine. This intellect I surrender to thee. I have employed its powers in devising and executing my own selfish plans, but from this time it is sacred to the service of God. This wealth and this influence, which thou hast given me, shall henceforth be devoted to the purposes for which they were bestowed. I will give myself to the work of doing good: I will seek my employment and my happiness in co-operating with thee, in carrying forward thy plans, for removing suffering, and drawing men away from sin. Lord, receive me as a servant and follower. Make me wholly thine own. Help me to begin immediately my new work, and to persevere in it to the end. Encourage and strengthen me. When difficulties and trials press around me, wilt thou sympathize with me and come to my help. When I shall stray again from duty, and forget this my solemn covenant with thee, restore my backsliding feet, and grant me forgiveness and peace. Watch over me to the end, and thus prepare me for a more faithful and a happier service in another world.

"In thus coming to thee, to commence a new life in thy service, all my hope for forgiveness for my past sins, and guidance and help for the future, is in thine undeserved mercy, through Jesus Christ, who died for me. I would be crucified with him, and thus bring to a close my life of sin. I would henceforth live a new life 'by faith in the Son of God, who loved me, and gave himself for me.'"

Now, who is there, young or old, high or low, rich or poor, who does not perfectly understand what is meant by such a surrender of himself to God as this? There are, doubtless, many who do not wish thus to enter into their Maker's service; they choose to continue in their own; but it is difficult to conceive how any one can say that he does not perfectly understand how to do this, if he is only inclined to do it, or can deny that entering thus into the service of God is the plain and unquestionable duty of every intelligent being whom he has formed. They, therefore, who do not begin at once to serve their Maker, neglect their duty, not because they do not know how to do it, but because they do not wish to do it. They love better the pleasures of sin.—*Abbott.*

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### BOTANY.—No. XVI.

### PAPAVERACEÆ.

This division of plants borrows its general denomination from the *papaver*, or poppy, of which an example may be seen in the red poppy (*papaver rhœas*) of our corn fields, which makes such a magnificent display of garish red in sandy soils. In some places the white poppy is to be met with; which is the same species as that from which the opium is prepared, and hence it is called *somniferum*, or sleep-inducing. The opium obtained in this country from the juice of this plant, either wild or cultivated, is many times less effective than the opium brought from Turkey; so much has climate to do with the maturation of this drug. The genera which compose this order are not numerous, and are connected with each other by the presence of about a hundred stamens, all of them seated below the fruit; two deciduous leaves for calyx, and four regular petals in the corolla. In budding the two leaves of the calyx compose a folding case for the protection of the other parts, resembling a bivalvular shell. We have again occasion to notice an arithmetical correspondence between certain members of the fructification; for here we observe two leaves to the calyx, and four, or twice two petals, in the corolla; and if the stamens be carefully examined, they will be found to be in sets, which are also divisible by two: such a numerical harmony has He who reckons up the grains of sand upon the sea-shore, impressed upon a single group of plants. The seeds are generally very numerous, and are borne upon ridges, which descend upon the inside of the capsule.

After having obtained a general notion of this order, by inspecting the poppy, we may look under the hedges which enclose some kitchen garden, in expectation of finding the greater celandine, which is known by its deciduous yellow flower, pale, or glaucous green leaves, and the yellow juice which exudes from it when wounded. The presence of this yellow juice enables us to ascertain the greater celandine, with more ease than a laboured description of its parts. A large dose of this juice is poisonous; but for many ages the herbalists have endowed it with properties of high utility; so that in some works it has been styled the "gift of Heaven." Agreeably to an old notion, received among the writers of other times, herbs often presented some sign or signature of their peculiar qualities; hence the yellow juice of the celandine seemed to intimate by its yellow dye that the plant was ordained for the removal of that saffron hue which characterizes the jaundice. The capsule of the celandine is composed of two valves, or folding pieces, and the seeds are curiously furnished with a glandular crest.

In sandy fields, near the sea-shore, the yellow-horned poppy makes a striking figure, with its large yellow flowers, and its wavy leaves, which embrace the stem at their base. The genus *glaucium*, of which the yellow-horned poppy forms a representative, may be distinguished from the *chelidonium*, or celandine, by its two-celled capsule and its kidney-shaped seeds, which are destitute of a crest.

We have now glanced, in a very cursory manner, at an assemblage of plants, which are closely allied by the conformation of the parts that are subservient to the ornament and protection of the fruit, and by the yielding of a milky or yellow juice, possessed of active properties. The inquisitive may here read one fold in the living page of nature, whose every leaf delights and gives us wisdom.

We will conclude by submitting a few examples to a single view.

*Papaver rhœas*, common poppy.

*Papaver argemone*, rough-podded poppy.

*Chelidonium majus*, greater celandine.

*Glaucium eutcum*, yellow-horned poppy.

*Argemone Mexicana.*—The writer of this paper, when in Mexico, heard great efficacy ascribed to the yellow juice of this plant in diseases of the eye: this suggests a curious correspondence between it and the celandine, the juice of which has long had a reputation for curing the disorders of that precious organ.

*Hypocoum procumbens.*—This is distinguished from the rest by having only four stamens, and by a seed-vessel, which resembles a pod.

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### OLD HUMPHREY ON MORNING WALKS.

When the body is in health, and the mind at ease, a morning walk before breakfast is a very delightful thing, but if, in addition to this, the morning be a fine May morning, the scene a pleasant one, and the heart in a happy frame, then it is more delightful than ever. It is said that they who rise early only now and then, love to talk of early rising all through the day, while they who are accustomed to it, enjoy it heartily as a thing of course, without prating about it. You must not, however, because I speak in praise of early rising, look on Old Humphrey as a lie-a-bed.

There are times and seasons when things which have been common to us, suddenly appear to greater advantage. It was thus with me the other morning, when walking abroad before the hum of the busy world had broke on my ear. The clear bright blue sky set me thinking of heaven and of angels. If the underside of heaven be so beautiful, what must the upper be! If the very floor of our heavenly Father's abode so delight the eye, how will his mansions of eternal glory overcome us with delight and surprise!

The balmy breath of the morning, in the neighbourhood of a nursery-ground, was sweet indeed; and the herbs and flowers, and rows of fresh-springing peas and beans, and strawberry plants, and the fresh ruddy shoots of the hawthorn, and the bulby clusters of young leaves on the top of the sycamore, about to burst into form and beauty, all spoke of hope and cheerfulness to the heart. At last I came to a spot so truly beautiful to the eye; a spot where wood and water, heightened by the jubilee of the rejoicing birds, so affected me, that I gazed upon it, and thought that if sin, and sorrow, and death could be banished from the world, earth would then become a kind of heaven.

For a moment Old Humphrey was half inclined to doubt whether aught in the heavenly world could exceed in beauty the earthly one; but this was but for a moment: for the thought occurred, If God has so clothed the grass of the field, so adorned with beauty the dwelling-place of sinners, how much more will he adorn the dwelling-place of saints! If the footstool of the Eternal be thus unutterably lovely, what will be the splendour of his everlasting throne?

The heavens we are journeying to will, doubtless, as much exceed the earth we inhabit, as spiritual things exceed temporal things. Here we can see, and hear, and conceive, what God has spread around us; but "eye hath not seen, nor ear heard, neither hath it entered into the heart to conceive what God hath prepared for them that love him."

On my return, when the sun was higher in the heavens, I passed by a pleasant house with a stone front. The windows were open, and the clean table-cloth was seen spread, with the coffee-pot standing on the table. The tones of a piano forte were heard, while a low, but melodious voice, chanted forth the morning hymn. The garden was in full bloom; the shrubs were green as the very grass; the flowers under the veranda, were beautiful; the very cat, sunning herself on the stone step, looked comfortable; and Old Humphrey stepped along with so light a foot, and so happy a heart, that he felt more like a young man than an old one.

If you are early risers, if you are walkers abroad while the east is glowing with the beams of the golden sun, you know something about these things; but if you are not, you are robbing yourselves of health and of happiness. If you rise betimes, you will enjoy more of God's creation; improve your health, temper, and tone of mind; the day will pass more pleasantly with you; and when night comes, you will, with a more fervent spirit, thank the Father of mercies for his abundant blessings, and sink into a sounder slumber.

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## CHEMISTRY.—No. XIX.

### ELEMENTS OF VEGETABLE AND ANIMAL SUBSTANCES.

Many of the subjects which have been briefly adverted to in former papers might have been pursued more at length, but the nature of the work has prevented a more enlarged description, and confined our attention to the principles rather than the details of the science. There is, however, one branch of chemistry that deserves some attention before we close our short introduction to chemistry; that is, the composition of the various substances in the vegetable and animal kingdom. The substances constituting these classes of bodies, and especially the vegetable, are presented to our notice under an almost boundless diversity of appearances; but the chemist has little to do with their external appearance; for although the most minute and tender plant is as much an object of his attention as the majestic forest tree, yet his only object is to determine the principles of their elementary composition.

After a very close examination of the internal structure of vegetables, it has been proved that they may all be resolved into a few elementary substances. "The method by which their compound elements are separated is simple; the vegetable is merely exposed to the action of the fire—not an open fire, for in this way all its parts would be dissipated or burned away—but in a vessel calculated to retain its principles in such a manner as to permit their being brought under examination. Green wood will be a good instance, as the representative of all vegetable substances. Take a common gun-barrel, the touch-hole of which has been stopped, push a small cylinder of green wood down to the breach, and place that end horizontally in a good fire. As the wood is heated, the water, which is the chief ingredient of its juices, distils over, and drops from the open end of the tube. In proportion as the water distils, from being insipid, it becomes sour. Shortly after a gas issues out of the tube, and may be collected by tying a moist bladder, the common air being well pressed out of it, round the mouth of the tube. If when the gas ceases to issue, the contents of the tube be examined, the piece will be found altered into a black, dry, light, sonorous mass, retaining however its texture, though much reduced in size. It is, in short, converted into charcoal, or in chemical language, carbon."—*Donovan.*

In the course of this experiment, hydrogen, carburetted hydrogen, carbonic oxide, and carbonic acid gases may be collected. The result of a series of experiments is, that all vegetable bodies are composed of four simple substances; oxygen, carbon, hydrogen, and an occasional proportion of nitrogen. These are termed the ultimate principles of vegetables. There are, however, a number of compound substances, which enter into their composition, and are more immediately presented to the senses: these are called their proximate principles. Of these, we may first refer to the alkalies of vegetables; such as those which are known by the names of quinina and cinchona; both obtained from the bark of the cinchona tree; and morphia from opium. There are also many acids, which have been already mentioned. Among the most remarkable of the other proximate vegetable principles we may mention the woody fibre or lignum, the resins, gums, and turpentine, the balsams which are obtained from particular trees, by incision, and the essential oils, so called from the supposition that they contain the essence of vegetables. Gluten, starch, and sugar, are vegetable principles; the latter being chiefly obtained in the West Indies from the sugar cane, and in France from the beet-root and grape.

The internal organization of vegetable substances is very imperfectly understood. During their growth they have the power of decomposing water and abstracting its hydrogen, and of absorbing carbon from the soil in which they are planted, as well as carbonic acid from the atmosphere. It has been ordained by the Creator that these vegetables should obtain their nourishment from bodies which are most prejudicial to animal life; a provision which recommends itself even to us. But the perpetual change of chemical composition which vegetables undergo is a subject of interesting inquiry. One of the most important, with which we are at present acquainted, is that of spontaneous decomposition, and the process of fermentation may also be mentioned. Under certain circumstances, and assisted by a moderate heat, the juice of the grape and of other fruits undergo an important change; gradually losing their sweetness, they are converted into wine. During the process, which is called the vinous fermentation, alcohol is formed; but when the liquor is exposed to a temperature of about 75° it passes through another important change, and the alcohol is converted into vinegar, or acetic acid; hence this process is called the acetous fermentation. Vinegar that has been long preserved has a tendency to lose its brightness and flavour, and to become putrid; the result of that which is called the putrefactive fermentation.

The ultimate principles of animal matter are the same as those of vegetables, with the addition of phosphorus and lime. There is generally a great proportion of carbon and nitrogen; and this is the principal distinction between the chemical constitution of man and the meanest vegetable. Bones, the skeleton of the animal frame, are chiefly composed of phosphate and carbonate of lime. Gelatine and cartilage, which exist in bones, and may be obtained from them, especially from those recently formed, are of a more flexible and tough nature. If bones are boiled for a considerable time in water, the gelatine they contain will mix with the water, and a jelly will be produced. This jelly may be boiled down into a hard substance, called portable soup. A substance very similar in its nature, may be produced in the same way from skins, hoofs, and horns; which is the glue of commerce. Gelatine is also found in the muscles, united with another important substance, called fibrin. Besides the muscles, there are other parts of the body, formed of the same materials; as the tendons, ligaments, membranes, and skin. There is another principle existing in horns, hoofs, and nails, called albumen. The blood is composed of two parts; the serum, which is a liquid of greenish colour, and the crassamentum, which is a jelly of a crimson hue.

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### HUMILITY.

In proportion as the christian grows in grace, he grows also in humility. Humility is, indeed, the vital principle of christianity; that principle by which, from first to last, she lives and thrives; and in proportion to the growth or decline of which she must decline or flourish. This first disposes the sinner in deep self-abasement to accept the offers of the gospel: this, during his whole progress, is the very ground and basis of his feelings and conduct, in relation to God, his fellow-creatures, and himself; and when at length he shall be translated into the realms of glory, this principle shall still subsist in undiminished force. He shall "fall down and cast his crown before the Lamb, and ascribe blessing, and honour, and glory, and power, to Him that sitteth upon the throne, and to the Lamb for ever and ever." The practical benefits of this habitual lowliness of spirit are too numerous, and at the same time too obvious, to require enumeration. It will lead you to dread the beginnings, and fly from the occasions of sin, as that man would shun some infectious distemper, who should know that he was predisposed to take the contagion. It will prevent a thousand difficulties and decide a thousand questions concerning worldly compliances, by which those persons are apt to be embarrassed, who are not duly sensible of their own exceeding frailty, whose views of the christian character are not sufficiently elevated, and who are not enough possessed with a continual fear of "grieving the Holy Spirit of God," and of thus provoking him to withdraw his gracious influence.—*Wilberforce.*

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### EMPLOYMENT OF GLORIFIED SAINTS.

Heaven is a state of rest; but not the rest of a stone, or of tired powers, but the rest of an active spirit, which can only be easy and at rest, when it is freed from the clogs that impair its vigour and restrain its activity. It is a freedom, indeed, from weariness, and an ease from all toil, but not a cessation from action; for there the saints of God serve him; not with dull and listless affections, as ours often are, but with life and vigour, joy and transport, for ever. Perfect faculties will then incessantly act on the most perfect objects, even the blessed God, and all that pertains to his honour and glory. It is a great service they do unto their eternal King, and they are employed in it for ever. There is no unbelief there, nor any corrupt affections, or evil passions, to turn away their minds from God, or to hinder the free and spontaneous motion of all the powers of their souls in the active and passive fruition of him. They find him such an object of superlative excellences, that nothing can cool their affection to him: hence they find such strong and deep joy, as dilates, enlarges, and invigorates their spirits in his service for ever. —*Crawford.*

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### THE CHRISTIAN CHARACTER.

A christian who is meek, humble, kind, patient, and lays himself out to be useful to others—who condescends to their ignorance, weaknesses, and infirmities—one who passes by provocations, injuries, and contempt with patience and with silence, except where the glory of God and the honour of truth call for a vindication—that pities all sorts of men in their failings and miscarriages—who is free from jealousies and evil surmisings—loves what is good in all, and even his enemies, who maltreat him;—such an one gives a fairer exhibition of the christian character, or of true and genuine christianity, the virtues and excellences of Christ, than thousands can do by means of the most splendid works of piety and charity, where this frame of mind is wanting in them. For men to pretend to follow the example of Christ, while they are proud, wrathful, envious, bitterly zealous, calling for fire from heaven to destroy men, or fetching it themselves from hell, is to cry to the Saviour, "Hail, Master!" and crucify him afresh unto their own power.—*Dr. Owen.*

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DAVID CONTEMPLATING THE STARRY HEAVENS.

## SCRIPTURE ILLUSTRATIONS.—No. XIX.

> "When I consider thy heavens, the work of thy fingers, the moon and the stars, which thou hast ordained; what is man, that thou art mindful of him? and the son of man, that thou visitest him?" Psalm viii. 3, 4.

In order to our entering into the true spirit and propriety of the eighth Psalm, we must form to ourselves an idea of David the stripling, and think we see him watching his flocks, in a summer's night, under the expanded canopy of the skies. The air is still; the heavens are serene; the moon, arrived at the full, is pursuing her majestic silent course; the stars (like peeresses on a coronation solemnity) assume their brightest robes, to attend the beauteous sovereign of the night, while both moon and stars concur to shed a soft undazzling lustre on all the subjacent landscape. David, at this happy period, a blameless youth, unpoisoned with ambition, and unfascinated by the witchcraft of court corruption; his heart unpolluted with lust, and his hands undipped in blood, is seated on a rising hillock, or on the protuberant branch of some stately tree. All is hushed. Not a bough rustles, not a leaf trembles to the breeze. The silent flocks are either carelessly grazing by his side, or slumbering securely at his feet. The birds have suspended their songs, until waked by the superior sweetness of his voice, and the music of his hand. For, charmed with the loveliness of the scene, and wrapt by the Holy Spirit into a seraphic flame of exalted devotion, he has laid aside his crook, he has taken up his harp, and is transmitting to the throne of God these grateful, these inexpressibly beautiful strains of admiring thankfulness.—*Toplady.*

## OLD HUMPHREY, ON LIFE INSURANCE.

If I could find one solitary being who had never lost a parent, child, relation, or friend; if I could find one who had no interest in the life or death of any human being; I should conclude, at once, that he would never trouble his head with any thing that might be said on the subject of "life insurance." But this is not a likely case. Death is too well known among us; the church-yard proclaims his victories, and the mourning weeds that are worn in remembrance of the dead, seem fearfully to increase.

Old Humphrey likes chiefly to talk of things that come home to the bosoms and business of his fellow-men. The common-place occurrences of life suit him; the every-day causes of joy and sorrow he loves to dwell upon; and rather would he take a thorn from the finger, or a care from the heart of one fellow-pilgrim, than tickle the ears of a thousand by a poor attempt to be eloquent. Those who listen to Old Humphrey must be content with homely subjects, and very homely observations.

The subject of "life insurance" is well worth the consideration of all who would willingly, when they quit this world of sorrows, secure the comfort of those who are dear to them. I am as likely as my neighbours to err in my judgment on this subject, but if I do err, it is the head, and not the heart, that is the offender. It is a most important subject; others have said much upon it, and "I also will show mine opinion."

There are a few among my christian friends who feel a strong objection against "life insurances." They think that insuring a life is something like impiously opposing the will of God; endeavouring to calculate as to the days that the High and Lofty One in his wisdom alone can number. Now, I think they are wrong in this prejudice, but God forbid that I should ever treat lightly the conscientious scruples of any one, especially of these, whom, for their christian consistency and integrity, I highly value. Still I think they are wrong. Not that I like the term "life insurance," for I do not think it a proper one. A perishing mortal man cannot calculate as to the remnant of his days; he cannot insure or be insured; but the term, "life insurance," merely means the act of making a prudent provision for those dear to us, when we shall be removed from the world.

But then, again, my friends say, "This is another reason why we object to it; for what right have we to mistrust God's providence and faithfulness? ought we not to commit those dear to us to God, instead of showing that we lack confidence in his fatherly protection, by taking the affair out of his hands, and making a provision ourselves?

My answer is,—That it argues no mistrust of our heavenly Father's goodness and faithfulness, to use the gifts he has bestowed on us for our own welfare, and the welfare of others.

Do we doubt God's fatherly care, because we plough the ground, and sow the seed that is to supply us with bread? Surely not. He could feed us, as he did his people of old, with manna; nay, he could make the grain to spring up without our assistance; but it is his good pleasure not to do this, but rather to use his creatures as a means in his hands, to administer to their own wants.

Old Humphrey thinks that he is clear on this point, and he regrets that any servant of the Redeemer should be hampered by scruples which he believes are ill-founded.

Let us put this matter in the plainest point of view, and show that we sin not in defending ourselves and others from the common evils to which we are liable.

Do we oppose God in pulling up the weeds that he has made to grow in our gardens? Or act disobediently in closing our eyes when his lightning flashes around us?

Because God sends the rain, must I not hold up an umbrella to defend myself from the drenching storm? Because God sends the plague, must I not take means and medicine to protect me from the fearful pest? O yes! for our heavenly Father often visits us with afflictions, to call forth those qualities, energies, and resources, with which he has mercifully endowed us. When God causes the sultry sun to shine on the earth, we dress in light clothing; but when he seals up the waters with frost, when he giveth "snow and vapours, stormy winds fulfilling his word;" when he "casteth forth his ice like morsels," who can stand before his cold, without warmer garments? Is it unlawful, then, with a dependent and grateful spirit, to use the comforts his bounty has placed within our reach? No! no! it cannot be. It is our duty, as it should be our delight, to live to his glory; and, as far as in our power lies, to provide for the wants, and extend the comforts, of those dependent upon us, not only during our lives, but after our death. The same holy Scriptures that rebuke unnecessary and sinful anxiety, by the injunction, “Take, therefore, no thought for the morrow,” reproves also an idle, careless, improvident disposition, by the command, “Provide things honest in the sight of all men;” and by the declaration, “But if any provide not for his own, and specially for those of his own house, he hath denied the faith, and is worse than an infidel.” Old Humphrey, then, believes that he is only acting a friendly part in advising all, who have the means, from an uncertain income, or one which continues only for their lives, to make a reasonable provision for their families, by effecting what is called a “life insurance.”

Thus far have I spoken to such as may not at present have been convinced of the great advantage of paying a small sum every year, that their wives, or their children, or their poorer relations, may, after a while, be benefited by it. I have now a word to say to a different class of people, even to the directors or managers of “life insurance” establishments themselves; and with great plainness of speech will I address them.

When we want the arrow to go right home to its mark, there is nothing like taking a single aim. This is what a good friend of mine calls using a rifle-barrel instead of a scattering blunderbuss. In place, therefore, of speaking to “life insurance” managers generally, I will speak to one only, with the hope that every manager who reads my homely observations will apply them to himself.

I will suppose, then, that you are a manager of a “life insurance” establishment, and if you are a friendly man, you will not quarrel with Old Humphrey because he steps out of his pathway for a moment, to take you by the hand. He hopes you are prospering in your undertaking, and the more so, because he thinks it a useful and a praiseworthy one.

It is not unlikely that we entertain different opinions on many points, but let us not think the worse of each other on that account: Old Humphrey is often in the wrong, whether you are or not; but do we agree in two things; first, that there is one great, and good, and merciful Being, who made us, and all things; infinite in wisdom and in power? and, secondly, that the holy Scriptures are his word and will? We ought not to doubt the first, because the sun, moon, and stars, that have been proclaiming it in heaven for nearly six thousand years, proclaim it still; because spring, summer, autumn, and winter, continually repeat the same truth; while the teeming earth, and the heaving ocean, bear their testimony to the same undeniable verity.

We ought not to call in question the second, because the Bible has been handed down to us with the most scrupulous care by God's own peculiar people, and its truth been confirmed by the testimony of its very enemies, as well as by the fulfilment of its prophecies. Its holy and faithful reproofs have convinced thousands of their sins, and its merciful promises gladdened ten thousand times ten thousand hearts.

If then we are agreed in these respects, both believing in the gospel of Jesus Christ, you must not be out of temper if I ask you this plain question, Have you insured your life? You see the reasonableness of others insuring, and you think that the arguments of Old Humphrey are what they ought to be in persuading them to do so; but bring the matter home to yourself—Have you insured your own life?

There is an office more safe, more liberal, and more advantageous than yours, and it has a Director infinitely more wise than you are. Is your name among the names of those who have insured there?

You perceive that Old Humphrey is not now talking of an earthly establishment, but of a heavenly one. You are not asked whether your name appears in your own books, but is it written in the Book of Eternal Life?

You seem to see clearly that all men must die, do you see equally clear that all must be brought to judgment? You seem to understand that all will die a natural death, do you understand also, that all who are dead in trespasses and sins will die an eternal death if they have not obtained pardon?

It may be that this matter may have escaped you; that you have not given it due attention; let me press it upon you urgently and affectionately.

It may be that you have been so much taken up in insuring the lives of your fellow-men in this world, that you have thought very little of Him, who alone can insure your own life in another.

Men commit strange mistakes, and you may have been calculating on the length of human existence, as if it depended entirely upon man, without bearing in mind that God alone is the Author of your existence and preservation, and that he only can loose the silver cord, and stop life's pendulum. Till the almighty decree goes forth, no man will die. Then, and not till then, "shall the dust return to the earth as it was, and the spirit shall return unto God who gave it."

And shall Old Humphrey, while he believes it possible that you are under such a sad mistake, shall he smile and speak pleasant things to you, and allow you to go unmolested down the slippery pathway that leads to so fearful a precipice? No! rather will he seize you by the arm, and compel you to listen to his remonstrance.

Did you never read the words, "All have sinned, and come short of the glory of God." "The soul that sinneth it shall die." "Except ye repent, ye shall all likewise perish?" These are not the words of Old Humphrey, a fellow-sinner; a poor, unworthy, mutable, dying worm of the earth; but the words of the living God; and so sure as we shall lie down and moulder in the dust, so sure as the High and Lofty One sits on the throne of heaven, his judgments and his promises will both be fulfilled. I ask you, then, have you insured your life?

Surely you will never urge another to buckle on his armour, to brave the temporary evils of time, and go yourself unarmed to encounter the never-ending evils of eternity? This, if done without reflection, would be thoughtlessness; but with reflection, folly and madness. Again, then, I urge the question, Have you insured your life? If not, hasten to the Author and Giver of life, present and eternal, with the inquiry, "What shall I do that I may have eternal life?" And the liberality of the terms will surprise you. "Hear, and your soul shall live. To the Lord our God belong mercies and forgivenesses, though we have rebelled against him." "This is a faithful saying, and worthy of all acceptation, that Christ Jesus came into the world to save sinners." "Believe on the Lord Jesus Christ, and thou shalt be saved."

The words of a weak, erring old man may be disregarded, however affectionately they may be spoken; and therefore Old Humphrey will not calculate on doing you all the good he willingly would do; but if his weak words should be attended with a Divine influence, they will be powerful enough to dispose you to reflection. At all events, refuse not an old man's blessing, who desires, with his heart and soul, that when you cease to be a director of a life insurance office on earth, your name may be found written in the Lamb's book of eternal life, and your voice be heard among the triumphant throng, saying, "Blessing, and glory, and wisdom, and thanksgiving, and honour, and power, and might, be unto our God, for ever and ever."

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### BAXTER UPON HIS DEATH-BED.

"You come hither to learn to die; I am not the only person that must go this way. I can assure you that your whole life, be it ever so long, is little enough to prepare for death. Have a care of this vain deceitful world, and the lusts of the flesh; be sure you choose God for your portion, heaven for your home, God's glory for your end, his word for your rule, and then you need never fear but we shall meet with comfort.

"God may justly condemn me for the best duty I ever did; and all my hopes are from the free mercy of God in Christ.

"I was but a pen in God's hand, and what praise is due to a pen?"

When he was asked how he did, his answer was, "*Almost well.*"

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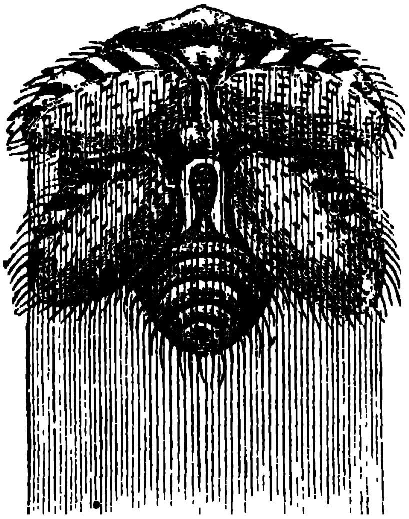
### SPIDERS AND THEIR WEBS.—No. I.

THE ingenious stratagem of the ant-lion for procuring its prey has already been detailed in p. 369 of the *Weekly Visitor* for 1834, as a sequel to it we here design to say a few words respecting the habits of a race of insects with which we are all familiar, and whose ingenuity, celebrated in every age, cannot but have often excited the admiration of our readers. We allude to the artifices of the race of spiders; to the net, the web, the filmy cordage, with which they entangle and secure their prey. All spiders, however, are not weavers or spinners. Some lurk in ambush under stones or leaves, and thence dart, tiger-like, upon such insects as pass. Some hunt down their victim, which they carry when seized to their den, that they may devour it at leisure. Some skim the surface of the water, and others, otter-like, dive after their prey, their bodies being kept unwet by an atmosphere of air which surrounds them.

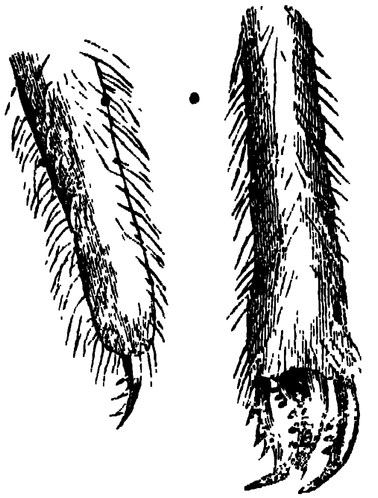
It is not to those that we shall now solicit attention, but to those that weave their web, or stretch their gauze-like net as traps for the unwary. Let us first examine the nature of the material employed. The thread of the spider is similar to that of the silk-worm and other caterpillars; being originally a viscid or glutinous secretion, drawn out from certain reservoirs on the body of the insect.



(Spinnaret magnified.)

"If you examine a spider minutely, you will perceive four or six little teat-like protuberances or spinners. These are the machinery through which, by a process more singular than that of rope-spinning, the thread is drawn. Each spinner is furnished with a multitude of tubes, so numerous, and so exquisitely fine, that a space often not much bigger than the pointed end of a pin, is furnished, according to Reaumur, with a thousand of them. From each of these tubes, consisting of two pieces, the last of which terminates in a point exceedingly fine, proceeds a thread of astonishingly slender; which, immediately after issuing from it, unites with all the other threads into one; hence from each spinner proceeds a compound thread; and these four threads, at the distance of about one-tenth of an inch from the apex of the spinners again unite and form the thread we are accustomed to see, which the spider uses in forming the web."

Of such delicate cordage is the web, or the mesh of the spider constructed; but how is this network interwoven? what are the instruments required for the elaborate work? The spider uses only the claws of its feet, nature's instruments. With these, the creature guides and arranges the glutinous threads as they are drawn from the spinners. In order to be more effectual as instruments, two of the claws (at least in many species) are furnished underneath with teeth like a comb, by means of which the threads are duly separated and disposed; but this is not all. It often happens, that the spider has to ascend by the line which has enabled her to drop from an elevation upon the ground beneath, and in so doing it winds up the line, as it proceeds, into a little ball. In this manœuvre, the pectinated claws are not used, but a third claw, between the other two, which appears to be provided expressly for such an operation. The fabrication of spinning spiders may be divided into two kinds; 1. close tissues or webs, composed of fibres, crossing each other in various directions; and, 2. an open-work of threads, more or less symmetrically arranged, constituting nets of exquisite beauty



(Spider's Claws magnified.)

Of the artificers which produce the former kind of manufacture, we may notice the common house spider, (*aranea domestica;*) of those producing the latter, the beautiful garden spider, (*epeira diadema,*) whose geometrical net-work is abundant during autumn along our hedges and on every bush.

The webs of the common house spider are well known to all; they are placed in corners of rooms, barns, stables, out-houses, and other situations; and are constructed as follows. Having chosen the site, and arranged the general plan and dimensions of the web, the spider dexterously affixes the first thread which is to form the edge or selvage of the tissue, to one of the walls, or to some convenient point; and then, drawing out her thread all the time, she forthwith proceeds to the opposite wall, or point, and there fastens it: this process she repeats several times; in order, by redoubling the threads, to give due strength to the margin, which will have to bear a considerable stress of material. From the margin thus formed, she next proceeds to draw threads in all directions; crossing and recrossing them, until, every interval being filled up, the web exhibits an irregular gauze-like structure, stretched horizontally from point to point, or filling a convenient angle. It often happens, however, that in addition to this web, there is an inter-melé of lines carried up from its edges, so as to form a maze of cordage so intricately blended, as to prove a snare to the heedless, rambling fly, for whose destruction they are spread. Thus is the web of the house spider arranged. But where is the grim artificer? Patiently lurking in a little hiding-place, or chamber covered with a close tissue of web, in some remote corner, concealed from superficial view, yet close enough for every convenience. Leading to this den, a number of threads vibrating upon the entanglement of the expected victim, inform the spider of the booty within her grasp: down she glides, like a sailor from the topmast, upon her struggling victim. If within the compass of her strength, she begins the attack at once, and plunges her venomous jaws into the body of the hapless captive; if the victim be large and powerful, and likely by dint of his exertions to break through the meshes around him, a more cautious mode is adopted. A cordage of threads is instantaneously lashed around him, and made secure; and thus enchained he is left till, wearied with unavailing struggles, he yields an unresisting sacrifice to the machinations of his cunning foe. So spreads the fiend of evil his snares of temptation and ruin. M.

## CHRISTIAN DILIGENCE.

Make a diligent improvement of all opportunities of grace. Sleep not in harvest time. Trifle not away your golden seasons. You have much work to do in a short time; you have a God to honour, a Christ to rest on, a race to run, a crown to win, a hell to escape, and heaven to obtain. You have weak graces to strengthen, and strong corruptions to weaken; you have many temptations to withstand, and afflictions to bear; you have many mercies to improve, and many services to perform. Therefore embrace all opportunities by which your best interests may be promoted. Take heed of crying, *To-morrow, to-morrow*, when God says, "To-day, if you will hear my voice, harden not your hearts." Remember that manna must be gathered in the morning.—*Brooks*.

## CHEMISTRY.—No. X.*

### ALKALIES.

The alkalies, as a class of bodies, may be very readily distinguished by some distinct and important properties. They are incombustible, possess a hot and acrid taste, are soluble in water, may be volatilized by heat, and have the property of changing the vegetable blues into green. Oils may be mixed with water, if united with the alkalies. They were formerly considered simple substances, but they have been decomposed by the agency of electricity. The word alkali is derived from the Arabic, and signifies the dregs of bitterness.

There are only three alkalies: potash, soda, and ammonia. The first two are termed fixed alkalies, because a very intense heat is required to give them a gaseous form; the last is called the volatile alkali.

"If a sufficient quantity of wood be burnt to ashes, and these ashes be afterwards washed repeatedly with water, till it comes off free from any taste, and if this liquid be filtrated and evaporated to dryness, the substance which remains behind is potash, not however in a state of purity, for it is combined with several other substances, but sufficiently pure to exhibit many of its properties. When heated to redness, many of its impurities are burnt off, it becomes whiter than before, and is then known in commerce by the name of pearl-ash.—*Thompson.*

Potash is a white, brittle substance, of an acrid taste, emitting a smell somewhat resembling that of lime when slacking. It is chiefly obtained from Russia and America, but is never sold, for common purposes, in a state of purity, but is always combined with a portion of carbonic acid. When exposed to the air, it will readily absorb water and carbonic acid, and is converted into a fluid. Pure potash is of a remarkably corrosive nature. If a piece of flesh be placed in a concentrated solution of this substance, it will soon be entirely destroyed. This alkali derives its name from the circumstance, that chemists procure it by burning vegetables in iron pots.

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* This piece was omitted by mistake, and should have been inserted between Nos. IX. and XI

Soda is obtained from plants that grow on the sea shore; the largest quantity of that which is sold in this country is procured from the barilla, and is brought from Spain. It is also obtained from kelp, which is found on our own coast, and from the decomposition of sea salt, of which it forms the base.

Pure soda is of a greyish-white colour, and has many of the properties which belong to potash, such as its taste, smell, and causticity. Soda has been, and is still called, the mineral alkali, but as potash may be obtained from some mineral as well as vegetable substances, this is a distinction without reason.

The fixed alkalies are employed in medicine, and in many of the arts and manufactures of our country. Combined with oil and fats, they are used in making soap; and from the property they possess of rendering silica fusible, they are of great use in glass making. They are also extensively used in dyeing and bleaching, and in the manufacture of alum. Their utility in domestic economy is well known. The alkalies are generally deprived of the carbonic acid they usually contain, those at least which are commonly sold, by the mixture of lime, which has a greater affinity for the acid than is possessed by the alkalies. They are then lixiviated in proper vessels, dissolved in water or some other fluid, to form what is called a lixivium, that is, a fluid impregnated with an alkali or salt. Both these alkalies, however, would be much less useful than they are for many purposes, if deprived of their carbonic acid, for this acid has a tendency to neutralize their causticity. The compounds are called carbonate of potash and carbonate of soda.

The other alkali, AMMONIA, was formerly known by the name of hartshorn, because it was then procured from the horn of the hart. Ammonia is designated the volatile alkali, in consequence of the extreme difficulty experienced in compressing it into any other form than that of a gas. If preserved in a liquid state, it has a constant tendency to volatilize. Ammonia, as a gas, is transparent and colourless, somewhat lighter than atmospheric air, and has an extremely pungent smell. This gas is a compound of nitrogen and hydrogen, and will not support animal life. Ammonia is generally combined with water, for which it has a strong affinity. Its taste is very similar to that of the fixed alkalies, but not so strong. Ammonia is procured from horns and bones, and is yielded in abundance by both animal and vegetable substances, when in a state of putrefaction. It is useful in medicine, and is employed in different manufactures. When united with carbonic acid, forming the carbonate of ammonia, it has a white appearance, and is that well-known substance, volatile salts. If it be passed over charcoal heated to redness, that deadly poisonous substance called prussic acid is produced. With muriatic acid it will combine, and the compound is the muriate of ammonia, better known by its commercial name, sal ammoniac. This is a useful substance in dyeing, tin-plate working, and in some other trades; it is also employed as a medicine. We cannot but refer the reader to this substance as an extraordinary instance of chemical combination. Two gaseous bodies, of the most volatile character, ammoniacal gas, and muriatic acid gas, unite together, and form a hard, heavy substance.

A new substance, called LITHIA, has been recently added, by some chemists, to the alkalies. It is exclusively of mineral origin, and possesses many properties which belong to the alkalies.

## COACHES.

Sir Walter Scott thus describes the grotesque appearance of a coach in Scotland during the reign of Charles II.: "The lord lieutenant of the county, a personage of ducal rank, alone pretended to the magnificence of a wheel-carriage, a thing covered with tarnished gilding and sculpture, in shape like the vulgar picture of Noah's ark, dragged by eight long-tailed Flanders mares, carrying eight insides and six outsides. The insides were their graces in person; two maids of honour; two children; a chaplain stuffed into a sort of lateral recess, formed by a projection at the door of the vehicle, and called, from its appearance, the boot; and an equerry to his grace esconced in a corresponding contrivance on the opposite side. A coachman, and three postilions, who wore short swords, and tie wigs with three tails, had blunderbusses slung behind them, and pistols at their saddle-bow, conducted the equipage; and, on the footboard, behind this moving mansion-house, stood, or rather hung, in triple pile, six lacquies, in rich liveries, armed up to the teeth."

Sorbiere, who visited England between 1664 and 1670, says that he went from Dover to London in a wagon drawn by six horses, one before another, and driven by a person who walked by the side, clothed in black, with a curious cap. The same writer says that he was two days in going from London to Oxford by the stage coach, though in 1603, the journey to Salisbury was performed in the same time, and that to Exeter in four days. Sir William Douglas notes in his Diary, that a frequent communication between the metropolis and various parts of the country, was established so early as the middle of the seventeenth century; and he speaks of travelling from London by the Coventry coach; and of Aylesbury, Banbury, and Bedford stages; again, in a comedy written during the Commonwealth, the first incident is the descent of the company from the Reading stage. A "Flying Coach" was next started from Oxford to London in thirteen hours, or about four miles an hour, but this was too expeditious, and two days were again allotted as the time for the journey.—*Domestic Life in England.*

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## BOTANY.—No. XVII.

### NYMPHÆACEÆ.

It is among those plants which contribute to ornament our rivers, the water lily takes a conspicuous place, easily known by its large cup-shaped yellow flower, and its broad heart-shaped leaves, which float upon the surface of the water. Water lilies, of different kinds, are to be found in other climates, but chiefly in the warmer. They all agree in a succulent habit, and consequently find nourishment proportioned to their wants in the streams and running waters. The corolla usually consists of several rows of petals, with four or five on each row, as the calyx happens to have four or five divisions. The stamens arrange themselves also in many rows, and by their forms furnish an object of curious interest; for the filament is much flattened, and retains so much of the nature of the petal, from which, by transformation, it is derived, that it may be regarded as in a kind of transition-state, a condition intermediate between a petal and a stamen. The stamens of the yellow water lily will serve as an exemplification of this remark, which at the first glance seem of an anomalous and doubtful character.

It is by such instances of the transition, or intermediate state, that we are taught to infer that all the members of a flower are as so many steps or grades in the scale of transformation.

The yellow water lily which we cited as an example of this order, forms the type of a separate genus, under the appellation of *nuphar*, and is essentially distinguished from the white water lily, by the smoothness of that fleshy bed in which the several seed vessels are immersed. In the white water lily, this crown which covers the seed vessels below, is larger and full of scars. The water lilies are not only a curious ornament in our streams, but they connect themselves with antiquarian researches by the *nymphæa lotus*, with representations of which the statues of two favourite deities of the Egyptians are often crowned.

This plant, remarkable for its beauty, is common in the Nile, and in all the stagnant pools of Egypt. The fruit is eatable, but can hardly have been that lotus so fabled for its charming sweetness of old, that if a man did but once taste it, he forthwith forgot all the engaging ties of home, and was content to live in perpetual oblivion of those attachments, which of all others, are thought to be most permanent.

The *zyzyphus lotus* belonging to the same order as the buckthorn, has been with much reason esteemed as the true lotus of antiquity, the berries of which are remarkable for their delightful taste. The nature of the true lotus may be ascertained, by considering that the jujube lozenges borrow their name from a species of the same genus as the true lotus, namely the *zyzyphus vulgaris*. Though the purchaser must not imagine that these lozenges contain any savour from the fruit of that tree; for it often happens, that the persons who prepare them never saw any jujube juice.

The last example we shall mention, is the *nelumbium speciosum*, or rose of the Nile. It is a native of India, from whence, at an early period, it was, perhaps, introduced into Egypt. The large rose-coloured, sweet-scented flowers are objects of peculiar splendor. When cut horizontally, or the top sliced off, the fruit exhibits an exact picture of an honey-comb, in the cells of which are lodged the seeds, which resemble beans: hence it came to pass that this plant was called the Egyptian bean. As this plant was deemed sacred, it was from this circumstance that Pythagoras obtained the hint he adopted about the sacred nature of the bean; though in respect of habit, structure, and appearance, there is not the slightest similitude between this beautiful sample of nature's handy work and that well-known familiar of our tables, the bean.

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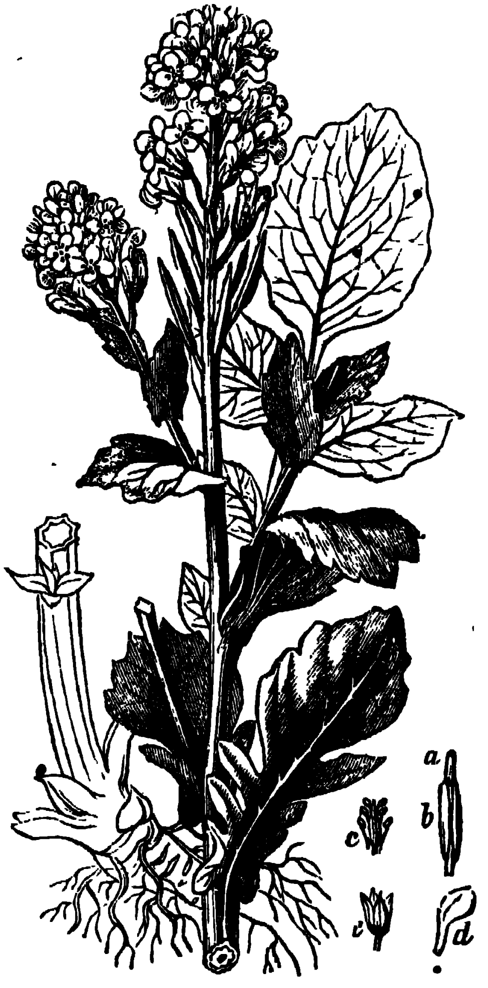

ERYSIMUM BARBAREA.

## BOTANY.—No. XVIII.

### CRUCIFERÆ.

THIS order, which has the expressive name of cross-bearing, in allusion to the uniform existence of four petals, shows such a harmony and agreement among its numerous members, that the most indifferent eye cannot fail to acknowledge it, when the most hasty comparison is made among them. The invariable presence of four petals, and six stamens, two of which are shorter than the other four, are marks of recognition accessible to all. The seed-vessel is constantly divided into two cells by a middle partition, as we see in the fruit of the *cheiranthus cheiri*, or wall-flower, which breathes its delightful fragrance from the walls of our old castles and various other structures of long-standing; or in the clove gilliflower, (*mathiola incana*,) the common inmate of our gardens; or in the dame's violet, which breathes its delightful fragrance at eventide.

Among the useful kinds of vegetable we

find many belonging to this family, which will serve as specimens for inspection. The garden cabbage, (*brassica oleracea,*) for example, when in flower will give a notion of the peculiarities which distinguish the cruciferæ. In the flower we find four petals, placed so as to correspond with two diameters of a circle, when drawn at right angles to each other, four longer and two shorter stamens, which are marks common to every member of the group. This important article of domestic cultivation contains upwards of thirty varieties; many of which are familiar to all. Among the rest, is the wild variety, the parent of all the others, which is found in some places on rocks near the sea shore. To this genus, (*brassica,*) distinguished by the closed nature of the calyx, and the tapering form of its pod, the turnip belongs, (*brassica rapa,*) not less remarkable for the odour which it diffuses, when in flower, than for its importance in the service of man. It is also a native of this country; but cultivation, as usual, has produced several varieties. To these examples of brassica we may add *B. napus*, or the navew, of which there are two varieties in general cultivation: the one for the oil which is afforded by its seeds; the other for the esculent nature of its root. In the class of edibles, though without any nutritive properties, may be reckoned the radish, (*raphanus sativus,*) the principal generic character of which is the jointed appearance of the pod, occasioned by the seeds being placed at some distance from each other, and the covering or capsule being pressed in between them. The seeds are round, and hang freely upon their stems. The sea-kale is approximated to the radish by the two-jointed nature of its pod. This plant, known as the *crambe maritima*, has a very disagreeable savour in its wild state, but by the process of earthing, which the French call etiolation, it is rendered a delicacy among the vegetables destined for the table. The water-cress, (*sisymbrium nasturtium*, or *nasturtium officinale,*) regarded as a "sallet" among the rustics from time immemorial, has become by cultivation one of the most abundant among vegetables. The mode of cultivation consists merely in keeping the roots clean, and supplying them with their wonted nutriment of fresh running water. In this genus (*nasturtium*) the pod is tapering, and either shortened or bent back, while the calyx and corolla have both of them their divisions spreading apart from each other. The mustard, so well known as yielding a condiment, and furnishing an agreeable relish at dinner, in company with the cress, belongs to this family. The mustard (*sinapis*) is distinguished by the valves or sides of its pods, which are marked with nerves, its little sharp-pointed style, and its spreading calyx. The charlork, (*sinapis arvensis,*) which often overruns the corn-fields, to the great dismay of the farmer, may serve as a wild example of this genus. After glancing at a few specimens generally met with in cultivated grounds, we may notice two or three that commonly present themselves in our excursions through the fields. We can scarcely advance three steps without finding the shepherd's purse, which is known by its small white flowers and its seed-vessels, which resemble little pouches. These pouches are divided by a transverse partition, which bears the seeds. In each cell of the shepherd's purse (*capsella bursa pastoris*) the number of seeds is various. This plant is found diffused all over Europe, India, Cape of Good Hope, and Japan. There is another sample of this order, which is nearly as common as the shepherd's purse; the yellow hedge mustard. It may be known by its small yellow flowers, and its fruit stem, when the pods are ripe, which is then so much lengthened out as to give the plant altogether another appearance. Even those who are not curious in plants, cannot fail to be struck with the strange transformation which takes place. The reason why this affects us with so little surprise is, that they are imagined to be different; and the writer has sometimes found a difficulty in persuading some persons that the leafy and not ungraceful plant, when in youth, was identical with the bare, dark-coloured, and lengthened plant when in fruit. In early spring, we find in every ditch the hedge mustard (*alliaria officinalis;*) it may be known by its tall straight stem, with flowers and broad leaves, which have the smell of garlic. This, till lately, was associated with the former, under the generic name of *erysimum*. In the alliaria, the pod is somewhat four-cornered; in the erysimum accurately so: in the former the calyx is loose, but in the latter closed. In this account we have taken no notice of the seeds, which, it is right to apprise the reader, are now regarded as the most important part in making distinctions. But as we are preparing a few sketches from nature of the part in question, we shall take another opportunity of laying the subject before our readers.

*Erysimum barbarea*, distinguished by

its bright green leaves, and its lively yellow flowers, is often found near the repositories of manure, and exemplifies the genus (*erysimum*) by the exact squareness or four-sided nature of its pods.

In our cut *a*, is the style; *b*, the germen or nascent pod; *c*, stamens, four longer and two shorter; *e*, calyx; *d*, petal.

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## ROMAN CATHOLICISM.—ITALY.

From Rae Wilson's work, "Records of a Route through France and Italy, with Sketches of Catholicism." Just published.

It is not probable that any plans for diffusing education among the mass of the people will be admitted into Italy so long as the priests retain their ascendancy; for they are well aware that an increase of knowledge—I ought rather to say a diminution of their present ignorance—would render the lower classes less superstitious and submissive. In roman catholic countries religion seems to be entirely the affair of the clergy and the vulgar. The educated classes, or, at least, such among them as are educated to think, are, with few exceptions, totally indifferent to religion, unless it be as far as it is their policy to impress their inferiors with its importance. Nor is this at all astonishing; since it is hardly possible that a thinking man should not be staggered at the palpable absurdities of romanism, even in its mildest form, and secretly despise what it may not be always safe or prudent openly to impugn. The extravagances of that system have been too frequently and too ably exposed to render it necessary more than to hint at them: saint-worship, relic-worship, priest-worship, the spells of paternosters, genuflexions, tapers, processions, the imputed authority of childish legends and ridiculous tales; and to all those, though in themselves but a part, may be added the forced and unnatural celibacy of the professed religious of both sexes, with the consequent violation of their vows. That the romish church appears no longer the arrogant despot it formerly was, cannot be denied; but the change has been wrought from without, pressed upon it by circumstances it could not resist. Had the reformation been extinguished in its birth, the Vatican of the nineteenth century would not have been a whit more tolerant than when in the zenith of its power; and perhaps at this very instant another Borgia or another Medici might have been seated in the papal chair.

## SPIDERS AND THEIR WEBS.—No. II.

Far more curious than the web of our common house-spider is the structure prepared by a species of hunting-spider (*uroctea 5-maculata*) found in Egypt, Dalmatia, among the mountains of Narbonne, and the Pyrenees. It is to M. Dufour that we are indebted for the history of its habits. "It establishes," according to his account, "on the under surface of large stones or the clefts of rocks, a dwelling in the form of a hood or bowl, of a full inch in diameter; its circumference presents seven or eight niches, of which the angles alone are fastened on the stone, by means of bundles of threads, whilst the edges are free. This singular tent is of an admirable texture: the exterior resembles the finest taffeta, and consists, according to the age of the manufacturer, of a greater or less number of layers. Thus when the uroctea, as yet young, begins to establish its retreat, it fabricates no more than two webs, between which it ensconces itself. Subsequently, and, as I think, at each moult, it adds a certain number of layers. Finally, when the period destined for reproduction arrives, it weaves an apartment expressly for the occasion more downy and soft, wherein to shut up the sacks of eggs and the recently hatched young. Although the external hood, or tent-cloth, may be, no doubt, designedly more or less fouled or obscured by foreign particles, which serve the purpose of disguising its appearance, the apartment of the industrious manufacturer is ever delicately neat and clean. The pockets or bags, which inclose the eggs, are four, five, or even six in number in each dwelling, which, however, is but a single dwelling; their form is lenticular, and their diameter upwards of four lines. They are made of taffeta, white as snow, and are furnished internally with the finest down. The laying of the eggs does not take place before the end of December or the beginning of January. The offspring have, therefore, to be protected from the rigour of the season as well as from the inroads of enemies. All has been provided against: the receptacle of this precious deposit is separated from the web, immediately in contact with the stone, by a layer of soft down, and from the outer envelope by the different folds described. Among the niches, which border the tent, some are altogether closed by the continuity of the web, but others have their edges simply wrapped over, so that the spider, by raising them, has free exit and entrance from and into the tent.

"When it goes abroad, to hunt for

food, it has little cause to fear the violation of its dwelling, possessing, as it alone does, the secret of the impenetrable niches, and the key of those which serve for ingress.

"When the young are of sufficient age to dispense with the cares of their maternal parent, they take their departure, and go elsewhere to establish their separate abodes, while the mother addresses herself to die in her tent. Thus, it is at the same time the cradle and the tomb of the uroctea."

The mansion of this interesting spider is, however, no more than its dwelling; it is not an engine in which to entrap its victim, like the horizontal web of the domestic spider already described, or the filmy network of the geometric spider of our garden, to whose labours we shall devote our concluding paper. M.

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## GOOD DEEDS.

Whosoever prides himself on his own good deeds, in the sight of God, must suppose one or both of two things: either that those good deeds have of themselves some power to gratify or benefit God, so as that the Deity owes him heaven in repayment for the advantages he has received from him; or that those actions, for which he expects rewards, were, at least, in his own choice to perform or to neglect, and such as, if he had neglected them, God could have had no reason for punishing him. But how different from the truth are both these suppositions! In the first instance, so highly exalted is God above all our actions and their consequences, that it is plain he needs none of our services; that the obedience of such worms as we are is as nothing in his sight, whom all the cherubim and seraphim serve in their bright and burning stations, who hath measured the waters in the hollow of his hand, and whose call the lightnings obey.

He bids us love each other, and do good to each other, because by this means we each of us shall make the other happy, or relieve each other's distress. He bids us be sober, honest, chaste, industrious, because it is by an observance of these rules alone that we can keep ourselves in health, in cheerfulness, and in worldly prosperity. He bids us pray to him, and give him thanks, and serve him, because he thus opens to us a fresh source of strength for the discharge of our duties; of hope and comfort under our necessary calamities; of that spirituality of mind and acquaintance with heavenly things, which is the purest pleasure a man can meet with here, and the necessary introduction to still purer and brighter happiness hereafter But in himself God needs us not! Had we never been born, our songs would never be missed in the full chorus of angels; and were we all now to perish, he could raise up, from the dust beneath our feet, a better and a worthier race of creatures than we are. Who, then, are we, and what are our good deeds, that we should venture to praise them in his presence? But further: all these things, in the performance of which we pride ourselves, are, after all, no more than our duty. We are commanded to do them; we are threatened most severely if we neglect them. All the good deeds which we have done are therefore, in fact, nothing more than so many instances in which we have not done evil; and who shall say that our not deserving hell, supposing it to be true, would be, in itself, an equitable claim on such a vast reward as heaven? —*Bishop Heber.*

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## CHEMISTRY.—No. XX.

### (CONCLUSION.)

It is scarcely possible for any man to acquaint himself with the general principles of science, without being impressed with the evidence of Almighty power, skill, wisdom, and benevolence which is constantly before him. No devout mind can peruse the brief outline we have given of the science of chemistry, without tracing the hand of a perfect Intelligence, or observing the irresistible proofs of contrivance, design, and benevolence evinced in the elementary constitution of bodies, and in the phenomena that result therefrom. The discoveries of modern chemists afford some of the most obvious illustrations of the munificence with which God has provided for the support, preservation, and comfort of his creatures, that can be selected from the records of scientific truth. It may not be inappropriate to refer, in this place, to a few of the more striking facts.

We have often thought that the comparative fewness of the elements that compose the materials and productions of the earth, might be mentioned as a proof of the wisdom with which the Creator has arranged the materials that he brought into existence. It is more than possible, that many of the substances we are unable to decompose, and consequently describe as elements, may be compounds, and that the number of simple substances is much less than we imagine: but, supposing that we have formed an accurate opinion of them, the simplicity of arrangement displayed in the constitution of matter must be admitted. An endless variety of appearances are presented by material objects, and yet they are all composed of, and may be reduced to a small number of original substances.

The constitution of the atmosphere is equally adapted to excite our admiration of creative wisdom. The precise proportion of oxygen and nitrogen, best adapted for the support and convenience of man, has been adopted; for if any other gases with which we are acquainted, or any other proportion of those employed, had been used for the purpose, animal life would either have been burdensome, or have suffered an immediate extinction. We might, therefore, with confidence, ask the atheist, Is there here no proof of design, no demonstration of wisdom, in the benevolent provisions for the happiness of man? But we should take a very imperfect view of the subject, if we did not connect with the facts already mentioned, the provision which has been made for the continuance of the present arrangement. Oxygen is constantly abstracted from the atmosphere, by the respiration of animals, by the process of combustion, and by other means. There should, therefore, be some restorative agent; and in the vegetable world we find it, for plants universally give off oxygen gas, and absorb the nitrogen.

The indestructibility of matter is another interesting subject of contemplation. Matter is constantly suffering change, but all its varieties of character and form are governed by established agents. When bodies suffer from combustion, or are reduced to a state of putrefaction, it might be supposed by the superficial observer, that they are deprived of all useful properties, or that the matter itself is destroyed. Such, however, is not the case; for there is only a change of character, and the substance produced may be of great value.

Both animal and vegetable bodies, during their growth, combine with other substances, obtaining support and nourishment from them. But these bodies may afterwards become the food of animated beings, and be made a part of them; but after having passed through a series of inexplicable processes, they are united again, without any absolute loss to the earthy matter from which they were derived, and may be afterwards adapted, by existing causes, to pass through the same succession.

" Nature with open volume stands,
To spread her Maker's praise abroad,
And every labour of his hands
Shows something worthy of a God.'

When we remember the boundless variety of form presented in the vegetable world, and that plants are composed of four or five elementary substances, we shall scarcely fail to deduce from the fact the wisdom and skill of the Creator. "When we consider," says Parkes, "that the many thousand tribes of vegetables are not only all formed from a few simple substances, but that they all enjoy the same sun, vegetate in the same medium, and are supplied by the same nutriment, we cannot but be struck with the rich economy of nature, and are almost induced to doubt the evidence of those senses with which the God of nature has furnished us. That it should be possible to modify and intermingle a few substances, and thence to produce all the variety of form, colour, and odour which is observable in the different families of vegetables, is a phenomenon too astonishing for our comprehension. Nothing short of Omnipotence could have provided such a paradise for man.

"Soft roll your incense, herbs, and fruits, and flowers,
In mingled clouds to Him, whose sun exalts,
Whose breath perfumes you, and whose pencil paints."

Happy the man who can thus study nature, and at the same time personally feel its Author to be reconciled to him through the sacrifice of Christ. J. W. S.

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## ALEXANDER, EMPEROR OF RUSSIA.

Dr. Pinkerton says:—The Princess Mestchersky enjoyed the intimate acquaintance and friendship of the late Emperor Alexander, for many years previous to his decease. He valued her superior talents and acquirements, and derived pleasure and edification from her intimate knowledge both of doctrinal and experimental christianity. His death proved a severe stroke to her; it was an event which she dwelt upon in several of her letters written to me at the time. And as the religious character of Alexander I. has been much suspected, even by some who formerly used to think favourably of it, and as it is but partially known to the world at large, I take the liberty of here introducing some extracts of a communication from the princess on this interesting subject, written at the time of his death, which will no doubt be read with pleasure. It is the lively effusion of a fervent and energetic mind, and bears the marks of a friendly partiality; yet there are matters of fact stated, and just views of the real religious character of the late emperor given, which few, except herself, had sufficient opportunities of knowing, or ability to appreciate.

"*St. Petersburg, June* 1, 1826.

". . . . View the Emperor Alexander, sovereign of an immense empire, at the head of a formidable army, proud of his power, full of the fire of youth, and ambitious of the glory of this world! He neglects, he misunderstands the source of all his blessings; and, trusting to an arm of flesh, he beholds victory and triumph before him, forgetting that 'no king is saved by the multitude of a host—a mighty man is not delivered by much strength.' He is still totally destitute of true faith. Bonaparte, like a thunderbolt, smites his troops in all quarters: they flee before this genius of evil, this messenger of wrath; and, in a short time, the emperor beholds a part of his empire devastated, the ancient capital of his dominions delivered to the flames, his people flying from city to city, his troops scattered in disorder, and without supplies: all around reigns desolation, and blood flows on every side.

"In this state of distress, the Lord supports him, but without revealing himself to him. He inspires him with courage and firmness: then he approaches nearer, and darts on his soul a ray of his grace, by the following means.

"About the middle of the year 1812, the emperor, about to quit St Petersburg, and having taken leave of his august family, had retired into his cabinet, and, quite alone, was employed in arranging some affairs before his departure. All at once he beheld a female enter, whom, at first, he did not recognise, there being little light in the room. Astonished at this apparition,—for never was a woman permitted to enter his cabinet without leave, not even of his own family, and, above all, at this unseasonable hour,—he, however, arose, went to meet her, and perceived her to be the Countess Tolstoi; who, excusing herself for the liberty she had taken from a desire to wish him a happy journey, presented him, at the same time, with a paper. The emperor, at all times condescending, and sensible of the least proof of attachment, thanked her, and bade her adieu. The paper he supposed to contain a petition for something, and therefore put it in his pocket; and, when she was gone, resumed his former employment. Soon after, he took his departure, without thinking more about it.

"At the first night's quarters, fatigued with cares, and alone, he wished to ease his thoughts, by turning them to some specific object: he took out the paper from his pocket, opened it, and saw with surprise that it contained the ninety-first psalm. He read it with pleasure, and its divine contents calmed his troubled spirit; and his heart said in secret—'Oh! that these words were addressed to me!' As this thought passed through his mind, some one entered the room, and interrupted him: he again set off, and all was forgotten.

"A considerable time after this, he found himself in Moscow, in one of the most critical periods of his life—(who can be ignorant of the terrible events of the memorable year 1812?) Alone in his cabinet, he was arranging some books on a table, one of which caused a volume of the Bible to fall down: it was De Sacy's version, in 4to. In falling, it opened; and the emperor, on taking it up, happened to cast his eye upon the page, and beheld again the psalm which had once comforted him. He read, he applied what he read, and he found every word suitable to himself; and ever after, until his last breath, he carried this psalm about his person, learned it by heart, and evening and morning recited it at his devotions. After his death, his valet-de-chambre stated, that the emperor had always a certain paper in his pocket, which he prohibited them from touching, otherwise than to remove it from one coat-pocket to another, according as he changed his uniform. No person had any knowledge of its contents, or believed that it could be any other than a paper of importance, which the emperor had received in some mysterious way; it was only when they opened it, at his decease, that they recognised the soul and sentiments of him whom they deplored. They sent this precious paper to the Empress Dowager, at St. Petersburg; and it was put into his coffin along with him.

"Now the softened heart of the monarch received this beam of light with joy; and from the moment that the new creature was born, he applied himself incessantly to the study of the Divine word, which he never put from him. He now came to know his weakness; he cried unto God; and the Lord armed him, like David, with faith and experience; whereupon, behold! a new Goliath falls beneath the strokes of him, whom, but a short time before, he expected to vanquish.

"We will not, however, attempt to follow this christian hero in the brilliant career of his victories; but merely remark, that he himself spoke of them in the following terms:—'I felt myself,' said he, 'like a child; experience had taught me my insufficiency; faith made me commit myself entirely to Him who had spoken to me in the psalm, and had inspired me with a security and a force altogether new to me. At every fresh difficulty to be overcome, at every decision to be taken, or question to be solved, I went, if I had an opportunity, and threw myself at the feet of my Father who is in heaven: or, recollecting myself for a few moments, I cried to him from the bottom of my heart; and all was smooth, decided, and executed marvellously; all difficulties fled before the Lord, who marched before me.' Without ceasing, I read his word. I remember, that one day, on entering a small town on the frontier of France, the name of which town I have forgotten, sitting in my calash, I was reading in the New Testament about the eunuch of Queen Candace reading the prophet Isaiah, and desiring some one to explain to him what he read. I then thought within myself—'Oh! that God would also send *me* some one to help me rightly to understand his holy will.' And at the very time I was desiring this in my heart, Madam Krudner sent, asking permission to see me. For a short time I believed that it was she whom God intended to employ for this purpose; but very soon I perceived that this light was nothing more than an *ignis fatuus*.' These are his own words.

"And, truly, it was the will of God that none but himself should instruct and guide this soul of his own choice, this heart open to his love; and I must say, that I have often been astonished; and not only I, but other persons also, even the most instructed and advanced christians, have been compelled to admire his enlightened faith, and his deep knowledge, drawn purely from the sacred Scriptures; his true humility, and how he gave himself up to that simplicity which the Lord requires, when he promiseth, 'Verily I say unto you, Except ye be converted, and become as little children, ye shall not enter into the kingdom of heaven.'

"Whence had he this divine knowledge? We know all those who surrounded him, all with whom he spoke on the subject of religion; but I am bold to say that there was not one among them who had reached his stature. His noble and tender spirit soon felt the chilling atmosphere of his court; and he spoke no more of religion, or of the state of his soul, or of his pious sentiments, except to the very few whom he knew to be of the same mind with himself.

"The two last years of his life were years of suffering. Sometimes sick himself, and not willing to show it, lest he should alarm his relatives and friends, he allowed his health to be silently undermined by evils which he did not oppose, until he was forced to do so in order not to fall an immediate sacrifice to them: at other times, he suffered exceedingly on account of the incurable disease of his august spouse, the empress, whom he seldom quitted in her sickness. He attended her during that period constantly: night and day he watched her himself, and administered the medicine to her: he marked with anxiety the least change, the slightest alteration in her case, a case which presented nothing but symptoms of despair.

"He died in peace, after having passed two of the happiest months which he had spent in this world; and his last words, after having received the communion, were, 'I have never felt so happy!' He was tired of his crown, he was tired of his throne; for he had taken up his cross to follow the Lord; and often, very often, had he longed for the moment when he should be called to lay it down, with his life, at the feet of his Saviour."

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### FAITH.

THOSE that receive Christ with an unfeigned faith shall never want a wedding-garment to adorn them in the sight of God. Faith itself is very precious in the sight of God, and most holy, 2 Pet. i. 1, Jude 20. God loves it because it giveth the glory of our salvation only to the free grace of God in Christ, Rom. iv. 16, and renounceth all dependence on any conditions that we can perform to procure a right to Christ, or to make ourselves acceptable to him. The excellency of faith lies in this, that it accounteth not itself, nor any work of ours, a sufficient ornament to make us acceptable in the sight of God. It will not be our wedding-garment itself; but it buyeth of Christ white raiment that we may be clothed, and that the shame of our nakedness may not appear, Rev. iii. 18.—*Marshal.*

## SCRIPTURE EXPLANATIONS.—No XXX.

"And the key of the house of David will I lay upon his shoulder."—Isa. xxii. 22.

How much was I delighted when I first saw the people, especially the Moors, going along the streets with each his key on his shoulder. The handle is generally made of brass, (though sometimes of silver,) and is often nicely worked in a device of filigree. The way it is carried is to have the corner of a kerchief tied to the ring; the key is then placed on the shoulder, and the kerchief hangs down in front. At other times they have a bunch of large keys, and then they have half on one side of the shoulder, and half on the other. For a man thus to march along, with a large key on his shoulder, shows at once that he is a person of consequence. "Raman is in great favour with the Modeliar, for he now carries the key." "Whose key have you got on your shoulder?" "I shall carry my key on my own shoulder."

The key of the house of David was to be on the shoulder of Eliakim, who was a type of Him who had the "government upon his shoulder; the mighty God, the everlasting Father, the Prince of Peace."—*Roberts.*

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## ALLOTMENT LABOURERS.

A most laudable union has been entered into by forty labourers, who hold allotments of land of Bolton King, Esq., M.P., in the parish of Tamworth, in Warwickshire, the form of which we insert:—

"We, the undersigned, agree to dig and plant, each according to our share, either by labour or by a subscription in money, the ground of any of us who may be unable to do it for himself on account of sickness, and for the widow of any of us for two years after the death of her husband."

(Signed by all of them.)

The proprietor of these allotments has lately stated, that, during two years, two only of his tenants have applied for parochial relief, and those were cases of accident, by which they were disabled; and that at present there are two widows left with large families, whose allotments are cultivated for them according to the agreement, they and their children doing the lighter work. These widows, of course, receive parish relief; upon which, with their own labour, and the advantage of their gardens, they can maintain their families decently and comfortably, very different from that state of hopeless poverty into which they would otherwise have been plunged.

## THE MISSIONARY AT THE GRAVE OF HIS CHILDREN.

The Rev. J. S. Meissner, Moravian missionary in Labrador, observes, "We have known what it is to mourn over the loss of beloved children, having accompanied two to their resting-place during our service in this distant land. I was once standing by the grave of my departed children, under a brilliant sun and cloudless sky, when suddenly a light shadow passed over the green turf. Looking up for the cause, I beheld a snow-white gull winging her lofty flight through the air. The thought immediately struck me—Thus it is with the dear objects of my mournful remembrance. Here indeed lies the shadow, but above is the living principle. Nor was the reflection without comfort to my wounded spirit."

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## THE CREATOR.

By Him were all things created that are in heaven and in earth, visible and invisible, Col. i. 16, 17. And because of the great notions and apprehensions that were then in the world, especially among the Jews, (unto whom the apostle had respect in this epistle,) of the greatness and glory of the invisible part of the creation in heaven above, he mentions them, in particular, under the most glorious titles that any other could or then did ascribe unto them: "whether they be thrones, or dominions, or principalities, or powers; all things were created by Him and for Him:" the same expression that is used of God absolutely, Rom. xi. 36, Rev. iv. 11, John i. 1—3. And those that are not under the efficacy of spiritual infatuation, cannot but admire at the power of unbelief, the blindness of the minds of men, and the craft of Satan in them who deny the Divine nature of Jesus Christ, 2 Cor. iv. 4.—*Owen.*

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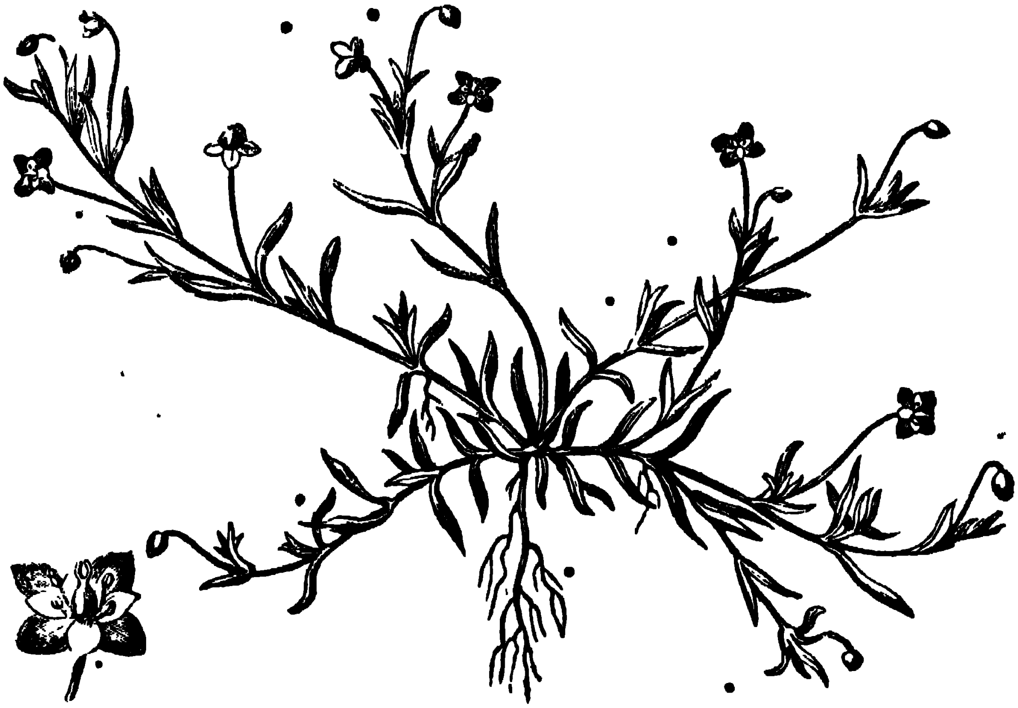

SAGINA PROCUMBENS.

## BOTANY.—No. XIX.

### CARYOPHYLLEÆ.

THIS order has for its representatives the lovely pinks and cloves of our gardens. But as cultivation often increases the beauty of a plant, at the expense of its botanical properties, by changing the parts more immediately concerned in preparing the seed into petals, which are more showy but less essential, it is better to look for a general outline of the characters which connect the members of this group with each, in the *lychnis*, or catchfly. The calyx is divided into four or five segments, which are often united into a tube, as in the pink and soapwort, (*saponaria officinalis*.) The petals are four or more, frequently five in number, inserted at the base of the germen, or nascent fruit. These have their borders sometimes variously divided; as we see in the meadow pink, a flower that appears on the margins of brooks and other moist places, in the early part of spring. The border of the petals is curiously jagged; which, with the conspicuous redness of their dye, cannot fail to render it a matter of easy recognition to the botanical inquirer. The seed-vessel is generally simple; that is, without division, with a central pillar, which is studded with many rows of seeds.

Many, who have looked but a little into the subject, are aware, that the introduction of the pollen into the seed while growing, is necessary, in order to render it fertile.

In the caryophylleæ, since the seeds are supported by a pillar, which ultimately becomes free at the top, it is essential that a communication should be established between the style, which is the conductor of this fertilizing material, and the seeds; this is done by a number of threads, which seem as if let down from the roof of the capsule to the seed-bearing pillar below it.

There is nothing more striking, in a diligent contemplation of the works of God, than the depth of the resources, and the choice of expedients, which the Creator has been pleased to employ. A right philosophy leads us to conclude, that the Deity is infinite in wisdom, as well as in power; the believer has the highest possible proof of it in his own salvation; but the student of vegetable nature finds a never-ending variety of instances, which exemplify and press upon him the conviction, that there is no limit to the multitude of those processes by which he can bring about any of his purposes. That countless number of forms exhibited by flowers, whether they embroider the meadow, adorn the sloping sides of our hills, or grow in the retirement and moisture of the wood or the rill, have all the same object to effect; namely, to serve in the protection and maturation of the seed. In fact, the science of botany, when considered fundamentally, is but the reckoning up of the various methods which the Creator has thought fit to make use of in bringing a seed to perfection.

But, to cite a few more instances, to illustrate this order, let us imagine ourselves walking by the side of some ditch, under the shelter of a hedge, in the month of April. We may observe, that under the covert of the bushes there is a copious display of snow-white flowers, ornamenting the bank without intermission. These flowers, we see, are borne by slender stems, which, at intervals, are furnished with pairs of narrow leaves. A closer observation shows that it has five petals, deeply cloven, ten stamens, three styles, and a capsule, which encloses a column paved with seeds. This is the *stellaria holostea*, or greater stitchwort. If, after surveying the flowers, we examine the leaf, we shall find one of its specific distinctions is the delicate teeth, which may be felt by passing the hand along the edge of the leaf.

The chickweed, which grows so abundantly in all cultivated ground, and in all situations where the soil is good, belongs to the genus *stellaria*. It may easily be known by the small fresh green leaves, and its small white flowers, which correspond in structure with the species just described. If the collector, when he has gathered a plant, should entertain any doubts about its identity with the chickweed, he has only to examine the stem, when he will find, if it be truly the herb in question, that a crest of hairs runs along one side of the stem, from its summit to its base. By this singularity the plant is easily determined.

There is a tall red flower, very common in our hedges, the *lychnis dioica*, or campion, which may be known by its agreement with the general characters given of this order, and by having the top or mouth of the tube formed by the petals, crowned with little coloured processes, like stunted petals. The singularity of this plant consists in this, that one plant furnishes stamens, and another a seed-vessel; whence it is said to be diœcious.

Amidst the standing corn, the corn-cockle (*lychnis githago*) often forms a conspicuous object, distinguished by the hoary appearance of its leaves, red flowers, and the length of the divisions of the calyx.

The mouse-ear chickweeds (*cerastium viscosum* and *vulgatum*) are ever at hand as we are passing through the fields, by the side of the footpaths. The small white flower, and small rough leaf, somewhat resembling a mouse-ear in shape, will distinguish them. The capsules burst at the top, and form a circular ring of ten teeth, which are bent back. This pretty little circumstance is the diagnosis, or distinguishing trait of the *cerastium*

On heaths, and by the sea-side, we may pick up the sand-worts, (*arenaria*,) known by their narrow fleshy leaves; and, in connexion with the general characters of this order, by the capsule parting into from three to six valves or points at the top.

The last example we shall mention, and of which we have given a figure, is the chickweed breakstone, (*sagina procumbens*,) an humble plant, which may often be seen growing in sandy places. The stem, by leaning upon the ground, is tempted, by the moisture of the earth, to throw out additional roots; hence it presents itself as a small tuft of branches, closely attached to the ground. The stamens in this plant are reduced to four, but the seed-vessel, opening at the top, and the general habit, connects it with the order before us. The collector should arrange these plants in a book by themselves, which would afford him an opportunity of tracing their common points of similitude, as they are varied with the respective tokens of generic and specific distinction.

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### OLD HUMPHREY, ON THE APPEARANCE OF THINGS.

Things are not exactly what they appear in any case; but, in some cases they are as different from what they appear as one thing can be from another. To know this in age is well; but could we know it in youth, it would be invaluable. This, however, cannot be expected: it is experience, and sometimes bitter experience only, that can correct our mistakes in this particular. Our very outward senses lead us astray, until they are assisted by knowledge and judgment, from the days of our infancy: a child thinks that the sun and the moon are no larger than they look to be. In his estimation, they are about the size of a pot-lid, or a wooden trencher. You may tell him, if you will, that they are bigger than the house; but you must tell him so many times over, before he will believe you.

A counterfeit looks very much like a golden coin, but there is a great difference between them, and when we have mistaken the one for the other, we feel sadly disappointed. It is so with a thousand things in the world: they are not half so valuable as they seem to be.

In the days of my youth, when playing with half a dozen of my companions, we saw something at a distance that shone as bright as a diamond; and a pretty scamper we had to get hold of it. A high hedge, a deep ditch, and a boggy field, lay between us and that which had so much excited our attention; but had the hedge been higher than it was, the ditch deeper, and the field ten times more boggy, they would not have hindered us from obtaining the prize. After tearing our clothes, splashing ourselves up to the neck, and running till we were out of breath, we found that which glittered in the sun's rays like a diamond to be nothing more than a bit of glass; a piece of an old broken bottle! Now I will venture to say, that you have many a time given yourself as much trouble as I did, and got nothing better than a piece of a broken bottle for your pains.

When a young man, Old Humphrey once saw a beautiful blue cloud resting on the side of a very high mountain in Cumberland, called the Skiddaw, and he thought it would be a very pleasant thing to climb up close to it; so he made the attempt: and if you have ever climbed up a mountain half as high and as steep as he found the Skiddaw to be, you will know that the undertaking was not an easy one. Oh, how many times did I turn my back to the mountain, to rest myself, before I had clambered half-way up its rugged sides! I did reach the cloud at last, but had not much reason to congratulate myself. That which appeared from Keswick vale a beautiful blue cloud, was, when I approached it, nothing more than a thick mist. Not only was it without beauty, but it hindered me from seeing any thing that was beautiful. The lovely valley, and the magnificent lake below me, were completely hidden from my view; and I came down from the Skiddaw in a much worse temper than I went up. I was very silly for thus being put out of temper; and must confess that since then, often has Old Humphrey got into a mist in following out the foolish inclinations of his heart. How has it been with you?

What a world of trouble we give ourselves to attain what is of little value! and disappointment works no cure; the failure of yesterday prevents not the expectation of to-day, and the blighted promise of to-day destroys not the hope of to-morrow.

Again, I say, that things are not what they appear, and we willingly allow ourselves to be cheated from childhood to old age, by running after or climbing to obtain what is any thing but the thing we take it to be. Oh that we could use this world as not abusing it, remembering that the fashion of it passeth away! but no! In vain the wise man tells us of the things we seek, that "all is vanity and vexation of spirit." In vain an apostle exhorts us "to set our affections on things above, not on things on the earth." Disbelieving the assertion of the one, and disregarding the exhortation of the other, we still like children, run after bubbles, that lose their brightness the moment they are possessed.

Old Humphrey is ashamed to think how keen a relish he has for the very things which have deceived him again and again. The glittering will-o'-the-whisps that surround him, look so like friendly tapers in hospitable dwellings, that he still follows them, till the bogs they lead him into convince him of his mistake. We may safely conclude, that "all is not gold that glitters," nor all pure that looks like snow.

But while we thus complain that things

are not what they appear, are we ourselves what we appear to be? Though I have been speaking of other matters, this is the question that I wanted to come to. This question, brought home to our hearts, is like cutting the finger-nail to the quick; taking a thorn out of a tender part; or, indeed, touching the apple of the eye; but it is worth while putting it for all that. Other people may pose us, but the closest method of questioning is, to question ourselves. Are we, then, what we appear to be? For if we are either ignorant of the evil of our own hearts, or railing against others when we are more guilty than they are, it is high time that such a state of things should be altered.

Were the Searcher of all hearts to put the inquiry to you and to me, Art thou what thou appearest to be? would not the reply be, "If I justify myself, mine own mouth shall condemn me: if I say I am perfect, it shall also prove me perverse. Behold, I am vile; what shall I answer thee? I will lay my hand upon my mouth."

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## SPIDERS AND THEIR WEBS.—No. III.

The geometric spider of our gardens (*epeira diadema*) is as remarkable for the beauty of its markings as it is for the lightness and filmy delicacy of the webs it constructs. Who, that has walked abroad on a fine autumnal morning, with his senses alive to nature's thousand charms, can have failed to notice the threads and circular net of this artist, laden with pearly drops of dew, hanging in profusion along every hedge-row and on every bush, and noticing, can have failed to reflect on Him who has taught

> "The wild bird how to build its nest,
> The insect weave its web!"

The mode in which the geometric spider constructs its net is very curious; and some points, connected with the subject, are not yet quite understood. Its first object is to construct the outline, which it does by passing from one leaf or sprig to another, fixing its threads as it proceeds, and thus encircling a considerable area. This outline it strengthens by fresh additions, until a due degree of toughness is produced, keeping the whole in the requisite degree of tension, by securing the line to every possible object.

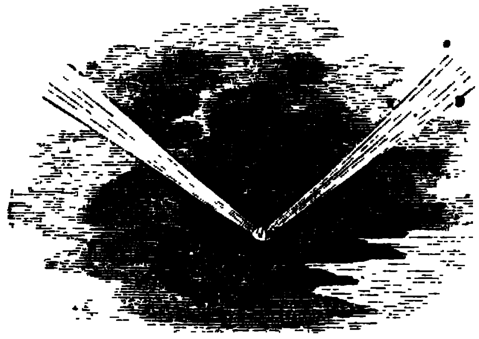
The outline thus formed, the next step is to fill it up by radii, like the spokes of a wheel. To do this, the spider fixes a thread to a convenient part of the outline, which she traverses until she reaches the opposite spot to that where she fixed her thread; all this time she was drawing out her line, keeping it distinct by one of her hind feet, so as to prevent its being glued to the threads along which she walked: this thread she now fixes; it crosses the middle of the area. She now alters her plan, and begins at the middle of this diagonal thread, where she fastens another, carrying it to the nearest part of the outline, to be there secured. From the same spot, which is to be the centre of the net, she again carries another thread to the outline, and so on until the number of radii are completed; generally from twenty to thirty. Having assured herself that each thread is sufficiently strong, which she does by pulling at each separately, and replacing such as may be found faulty, the spider next proceeds to form the concentric circles; beginning at the centre, she spins a ring, attached to each radius at a little distance from the centre point; this is followed by others at a very small interval from each other: the interval, however, increasing as she proceeds from the centre to the circumference. The whole of these circles being finished, she now returns to the centre, and bites off the point at which all the radii were united, so as to make their security depend on the circular threads alone; by this mode the elasticity of the net is most probably increased. In this central spot the spider takes her station, on the watch for prey. This is, however, by no means an invariable rule; for she always spins a cell in some retired spot, in which to lurk unobserved, having threads of communication from her retreat to the centre of the net, the vibrations of which serve to inform her of the capture of her booty.

So far all is tolerably plain; but we have yet to account for those long lines, stretched to distant points, which it was impossible for the spider to have personally visited. These lines sometimes pass from the web to distant branches; sometimes from one branch to another; we have seen them yards in length, passing from a hedge-row to trees a considerable distance, and at various degrees of elevation from the ground.

The explanation of the fact is thus solved by Mr. Blackwall, who says, "I have thoroughly satisfied myself, by observation and experiment, that in such instances spiders invariably avail themselves of currents of air, by which their lines are sometimes carried to a surprising distance. If the geometric spider be placed on twigs, set upright in glazed earthen vessels, with perpendicular sides, containing a sufficient quantity of water sufficiently to immerse their bases, the spiders thus insulated use every means in their power to effect an escape; all their efforts, however, uniformly prove unavailing in a still atmosphere: nevertheless, when exposed to a current of air, or when gently blown upon with the breath, they immediately turn the abdomen in the direction of the breeze, and emit from the spinning apparatus some of their liquid gum, which being carried out in a line by the current, becomes connected with some object in the vicinity. This the spider ascertains by pulling at it with her feet, and drawing it in till it is sufficiently tense; she gums it fast to the twig, and passing along it speedily regains her liberty. Now, that the same means are frequently resorted to by spiders in their natural haunts, for the purposes of changing their situation and fixing the foundations of their snares, I have repeatedly observed."

It must not be forgotten, however, that this theory of Mr. Blackwall is by no means confirmed. On this subject, we refer to a most interesting paper on the aërial spider, by J. Murray, Esq., in the first vol. of "Loudon's Magazine of Natural History." This talented writer observes, that "the aëronautic spider can propel its threads, both horizontally and vertically, and at all relative angles in *motionless air*, or in an atmosphere agitated by winds; nay more, the aërial traveller can even dart its thread, to use a nautical phrase, in the 'wind's eye.' My opinion and observations are based on hundreds of experiments; on favourable occasions I am constantly extending their amount, and as often do I find my deductions supported, namely, that the entire phenomena are electrical."

Subjoined we present a sketch of the gossamer spider, sailing along in a parachute, formed by two diverging fasciculi of threads, as observed by Mr. Bowman. In this aërial navigation the little insect floats with its back downwards and its legs folded, and thus reposing at its ease, upborne on streamers of silken threads, it commits itself to the upper air. M.



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## THE ENGLISH LANGUAGE IN INDIA.

The Rev. A. Duff, missionary of the Church of Scotland, in India, observes:—

With regard to the medium of teaching in our institution, it is English. There is appended to it a Bengali school, where the pupils daily attend, in successive classes, to perfect their acquaintance with the vernacular tongue. But the grand medium, by which all our knowledge is conveyed, is the English language. This has led some to think that our scheme is to eradicate the native languages altogether, and substitute English universally in their place. No such thing was ever dreamed of: no such conspiracy against the languages of India ever entered our imagination. It is the misconception, the delusion, of ignorant or thoughtless minds. What we declare, without fear or contradiction, is, that while it is confessed that the vernacular languages alone are available for imparting an elementary education to the mass of the people of Hindostan, it is insisted on as a fact, that these languages do not at present afford an adequate medium for communicating a knowledge of the higher departments of literature, science, and theology. For such a purpose, these dialects do not contain a sufficient number and variety of terms; and even if they did, there are no original writings, and not enough translated, nor will be, for centuries to come. The English language, and it alone, is found to supply the necessary medium. It is accordingly employed as the only adequate instrument for the conveyance of every branch of useful knowledge, with the view of raising up a higher and more effective order of men, who shall spread a healthful influence over society on every side. The English in India holds the same place now, which the Latin and Greek did in Europe at the period of the reformation. Where did our reformers obtain their information? Not in the vernacular tongues, because these did not contain it. They had to search for it in those ancient languages in which were embodied all the treasures of the existing knowledge. But, by degrees, some of the original European languages have become so enriched by the incorporation of foreign terms, that the necessity for studying the ancient ones, as media of knowledge, is in a great measure superseded. Precisely similar is the case of India. Do we want to raise up there a class of men who shall have the stamp and character and energy of reformers? If so, they must be the recipients of a higher knowledge. And where is this knowledge to be acquired? Not, surely, in the native languages, which have it not; but in that modern language which has it all in highest perfection—the English. And when the former become sufficiently enriched by a copious infusion and intermixture of expressive terms, drained from other sources, the latter may, as a medium of acquiring knowledge, be altogether dispensed with. Thus, for the present, must the English language in India be viewed as the medium of acquisition to the thoroughly educated few; and the vernacular dialects, to the ordinarily educated many. The one forms the channel of contribution to the reservoir of those minds that are to be cultivated, so as to disseminate all knowledge; the other will form the channels of distribution to those who must be satisfied with the mere elements of knowledge. The former unseals the inexhaustible fountain of all knowledge. The latter serve as ducts to diffuse its vivifying waters over the wastes of a dry and parched land. To those who have studied the history of the world, and traced the rise of reformations, and marked the progress of society, I now appeal, whether the process now described be not a rational one: one based on the lessons to be gathered from the experience of ages? The English language, I repeat it, is the lever which, as an instrument, is destined to move all Hindostan.

This naturally leads me to refer to a crisis in the history of India which seems now approaching. If, as has been shown, the communication of useful knowledge will destroy the ancient Hindoo systems; and if the English language cannot be thoroughly mastered without such knowledge being acquired, what follows? The universal spread of English would prove the universal death-knell of the Hindoo systems. And what next? One almost shrinks from the contemplation of it. Weigh the facts of the case. Already, in Calcutta, Allahabad, Delhi, and other stations, there are government seminaries established where English is taught without religion. And the demand for English is likely soon to increase tenfold, if not a hundred-fold. The reason is obvious. Till very recently, the language universal in India as the language of government business, political, financial, and judicial, has been the Persian, whose attainment will not enlighten, though it may greatly darken the mind and vitiate the heart. At present there is a strong disposition to abolish it altogether, and substitute the English in its place. About two years ago, it was abolished in the political department of government. This change has already begun to work. In the great native courts, instead of a Persian, must in future be supported an English secretary: and the next step is to send for an English schoolmaster. In some instances these two offices have been conjoined, so that in several of the palaces of the rajahs there is now an English school. Owing to this substitution of the English for Persian, a considerable sensation has taken place. The present noble and enlightened governor has given intensity to this sensation. Instead of sending, as heretofore, presents of cashmere shawls, and other oriental ornaments, to the different princes, he has, with a wisdom peculiar to himself, as governor-general of India, resolved, in most cases, to substitute something more profitable; such as globes, atlases, telescopes, microscopes, barometers, thermometers, and English spelling-books, with large pictures in them, to suit eastern taste; often accompanying them with a note to this effect, "That having understood that such a person was aware of the great difference between the learning of the east and of the west, he wished he would, by comparison, ascertain the nature and amount of these differences, and, at his own convenience, acquaint him with the result of his inquiries." Such requisition was admirably calculated to stimulate curiosity; and the consequence has been, that from the Burman empire to the banks of the Indus, there has been, more or less, a demand for English books and English teachers.

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### OLD ENGLISH MANSION.

The chief feature in the interior of an ancient residence, of every class, was the great or stone hall, which often gave its name to the whole house. The principal entrance to the main building, from the first or outer court, opened into a thorough lobby, having on one side several doors or arches, leading to the buttery, kitchen, and domestic offices; on the other side the hall, parted off by a screen, generally of wood carved, and with several arches, having folding doors. Above the screen, and over the lobby, was the gallery for minstrels, or musicians, and on its front were usually hung armour, antlers, &c. The hall itself was a large and lofty room; the roof was richly carved and emblazoned with the arms of the family; and "the top beam of the hall," in allusion to the position of this coat of arms, was a toast, or symbolical manner of drinking the health of the master of the house. At the upper end of the hall, furthest from the entrance, the floor was usually raised a step, and this part was styled the dais, or high place. The windows usually ranged along one or both sides of the hall, at some height above the ground, so as to leave room for wainscoting or tapestry below them. They were enriched with stained glass, representing the armorial bearings of the family, their connexions, and royal patrons, and between the windows were hung full-length portraits of the same persons. The royal arms usually occupied a conspicuous station at either end of the room. The head table was laid for the lord and the principal guests, on the raised place, and other tables were ranged along the sides for inferior visitors and retainers. In the centre of the hall was the rere-doss or fire-iron, against which fagots were piled, and burnt upon the stone floor, the smoke passing through an opening in the roof immediately overhead, which was generally formed into an elevated lantern, a conspicuous ornament to the exterior of the building. In later times, a wide-arched fire-place was formed in the side of the room. By a record of the year 1511, it appears that the hall fire was discontinued at Easter-day, then called God's Sunday; and the fire-irons being cleared away, the space whereon the fire was burnt, or the hearth, was strewed with green rushes and flowers; whence the custom, in our time, of decorating stove-grates with evergreens and flowers when they are not used for fires. The halls at the universities of Oxford or Cambridge furnish a picture, particularly at dinner, of the style and customs of the olden time; and those who are curious to know the mode in which our ancestors dined in the reign of the Henrys and Edwards, may be gratified by attending that meal in the great halls of Christchurch or Trinity College, and imagining the occupants of the upper table to be the baron, his family, guests, and the gowned commoners at the side tables to be the liveried retainers. The service of the kitchen, butteries, and cellars, is conducted, at the present day, precisely according to the ancient custom.

The hall, such as we have described it, is found in every old English mansion built before the reign of Elizabeth. But, about that time, the nobles began to disuse the custom of dining in company with their retainers and household in the great hall, and a separate apartment was reserved for the use of the family, which was called the dining-parlour, or banquetting room. The chapel was another principal feature in every early English residence. It usually formed one side of the first court. Both the hall and chapel were often overlooked from windows in galleries and upper rooms. The other apartments were the great chamber, or withdrawing room, (now called the drawing-room,) usually reserved for state occasions, and hung with tapestry; and the gallery for the reception of visitors, for amusement, and in-door exercise. This was a long room, with several bay windows, projecting externally, and forming agreeable nooks for private conversation within. The gallery was often embellished with royal or family portraits, maps, &c. The larger houses had, in addition to these apartments, the smaller in their stead, the parlours—sometimes divided into summer and winter parlours. Of these rooms, some were hung with tapestry, others wainscoted in small panels also of richly-grained oak, and the ceilings framed into panels, also of oak, for which plaster has been substituted. Texts of Scripture and moral truths were sometimes painted on cloths, which were hung in the pannels of the hall or parlour.

Kitchens merit separate mention. The oldest kitchens are said to have been built by the Romans. They were mostly octagonal, (or eight-sided,) with several fire-places without chimneys: there was no wood in the building, and a stone conical roof, with a turret at the top, let out the steam and smoke; some, however, had vents below the eaves, to let out steam. They generally had four ranges, a boiling place for small boiled meats, and a house for the great boiler. In each kitchen was usually a place for keeping flitches of bacon, similar to our racks in farm-houses.

Staircases in the older houses were carried up in separate turrets, generally circular; the steps being of stone, running round a pillar in the centre, and the outer hand-rail grooved into the wall. In the reign of Elizabeth, staircases first became splendidly ornamented; being of wood, enriched with massive hand-rails and balustrades, curiously carved, while the landings were superbly ornamented with figures, &c.—*Domestic Life in England.*

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### THE ALMIGHTY.

The almighty Architect stretches out the north, and its whole starry train, over the empty space: he hangs the earth and all the ethereal globes upon nothing: yet are their foundations laid so sure, that they can never be moved at any time:—no unfit representation to the sincere christian of his final perseverance; but such as points out the cause that effects it, and constitutes the pledge which ascertains it. His nature is all enfeebled, he is not able of himself to think a good thought, he has no visible safeguard, nor any sufficiency of his own; and yet, whole legions of formidable enemies are combined to compass his ruin. The world lays unnumbered snares for his feet; the devil is incessantly urging the siege by a multitude of fiery darts or wily temptations; the flesh, like a perfidious inmate, under colour of friendship and a specious pretence of pleasure, is always forward to betray his integrity: but, amidst all these threatening circumstances of personal weakness and imminent danger, an invisible aid is his defence. "I will uphold thee," says the blessed God, "with the right hand of my righteousness." Oh comfortable truth! The arm which fixeth the stars in their courses, and guides the planets in theirs, is stretched out to preserve the heirs of salvation. "My sheep," adds the great Redeemer, "are mine; and they shall never perish, neither shall any pluck them out of my hand." What words are these! And did they come from Him who hath all power in heaven and earth? And, were they spoken to every unfeigned though feeble follower of the great Shepherd? then Omnipotence itself must be vanquished before they can be destroyed, either by the seductions of fraud or by the assaults of violence. If you ask, therefore, What security have we of enduring to the end, and continuing faithful unto death? the very same that establishes the heavens, and settles the ordinances of the universe. Can these be thrown into confusion? Then may the true believer draw back unto perdition. Can the sun be dislodged from his sphere, and rush lawlessly through the sky? then, and then only, can the faith of God's elect be overthrown finally. Be of good courage, then, O my soul; rely on those Divine succours which are so solemnly stipulated, so faithfully promised. Though thy grace be languid as the glimmering spark, though the overflowings of corruption threaten it with total extinction, yet, since the great Jehovah has undertaken to cherish the dim principle, many waters cannot quench it, nor the floods drown it. Nay, though it were feeble as the smoking flax, Almighty Goodness stands engaged to augment the heat, to raise the fire, and feed the flame, till it beam forth, a lamp of immortal glory, in the heavens, Isa. xlii. 3, Song viii. 7, Isa. xli. 10, John x. 28.—*Hervey.*

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### TAXES IN SWEDEN.

With respect to taxes in Sweden, there is one on elegant furniture, pictures, gilded ornaments, and splendid female attire. Such are the sumptuary rules observed respecting their dress, that it amounts to a high offence if servants presume to imitate their mistresses in any part of their apparel, especially that of the cap. If regulations of this nature were introduced into England, I am disposed to think it would not be found so very difficult to distinguish domestics from their masters and mistresses, in consequence of that rage for dress, which so universally prevails. Foreigners who have acquired a fortune in Sweden, and who are disposed to leave it for another country, are obliged, on quitting it, and transferring their property to other hands, to pay one-sixth part of the whole to government.—*Rae Wilson.*

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### SCRIPTURE EXPLANATIONS.—NO. XXXI.

"Now the coat was without seam, woven from the top throughout."—John xix. 23.

I have often heard this passage disputed, and have heard many ridiculous and infidel observations made upon it. The passage presents no difficulty to Hindoo weavers; they have a method of weaving garments without seam, from the top throughout, as stated in the text.—*W. Brown.*

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Self-will.—Men, left to their own wills, will rather go to hell than be beholden to free grace for salvation, John v. 40.—*Cole.*

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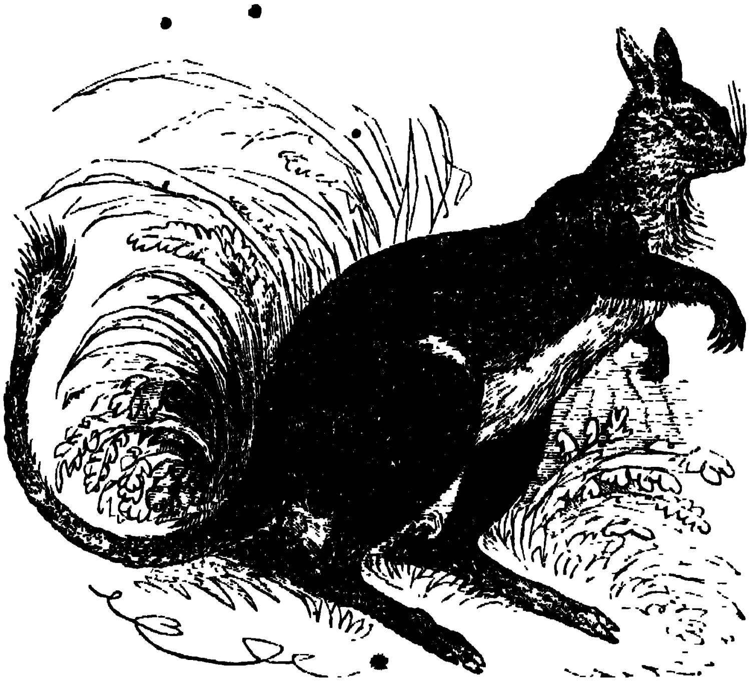

THE CAPE JERBOA, OR LEAPING HARE.

WHEN we turn our attention to the vast assemblage of the smaller mammalia, distributed throughout the globe, we cannot but feel convinced that our information on their habits and manners is, for the most part meagre and imperfect; that too often indeed the naturalist has to content himself with that degree of knowledge, if knowledge it can be called, which relates merely to their general affinities in the group to which they belong, while their peculiar habits and instincts are almost wholly unknown.

Some animals, terrific from their power and disposition, imposing from their bulk, or attractive from their beauty, force themselves, as it were, upon our notice, and compel or court us to watch their movements. Those, on the contrary, to which we now refer, are unobtrusive and retiring: their timidity and feebleness lead them to avoid the scrutinizing eye of man; and though the depredations they not unfrequently commit in the fields and enclosures, which own his careful labour, are repaid by a system of extermination, still little or nothing is known about them; they are regarded as a set of insignificant miscreants, whose habits are only annoying and vexatious, but beneath especial inquiry. What in reality do we know of the habits of the small *rodentia* of Europe? Very little of most, and still less, as might be inferred, of those of the small *rodentia* of distant climates.

In the singular animal now presented to our readers, we have an example in point. It is the leaping hare or Cape jerboa, common in many parts of Southern Africa, but of the minuter detail of whose history, much yet remains to be collected. Here the naturalist must depend upon the traveller; but it too often happens that travellers have not the opportunity, (environed as they mostly are, by unnumbered difficulties,) of following out a series of zoological observations; and many, perhaps, have not the inclination. The picture of an elephant-hunt is more spirit-stirring, more romantic, than a description of the simple habits of a timid little animal, whose burrow is its refuge, and whose hours of pleasure and activity are during the silence of the night. Such an animal is the Cape jerboa, *Helamys cafer*. F. Cuvier. *Pedetes cafer*. Higea.

The Cape jerboa is an animal of the rodent order, and in the general contour of its body, the disproportion between the fore and hind limbs, and in the mode of progression, which is by a succession of leaps, it bears an evident relationship to the true jerboa (*dipus*) with which it was formerly associated, and from which it has been separated by modern naturalists; the grounds of such separation consisting in the character of its teeth, connected with various minor details. A glance at the Cape jerboa is sufficient to remind us of the kangaroo, to which animal it exhibits a marked analogy in many particulars, and especially in the form of the posterior extremities, and the hoof-like nails, with which the toes are protected. The Cape jerboa may be thus described:—In size, it is equal to a common hare; the fur is soft, of a brownish yellow or dark fawn above, passing into white on the under surface; the tail is tipped with black. The teeth consist of two incisors above and below, and four molars on each side. The head is large, the ears long, the eyes full and dark; the fore limbs are exceedingly small, and terminated by five toes or fingers, each furnished with a long, curved, and pointed nail. The hind quarters are developed and muscular, the posterior limbs being large and strong; on each foot there are four toes, protected, as we have observed, by strong hoof-like nails. Burchell observes, that the fore-claws of this animal seem better adapted for holding its food than for scratching up its burrows, while the strength of the hind limbs (which are ten inches long, while the fore are little more than two,) together with their powerful nails render them fitter instruments than the former for excavating the earth, and this is said to be their use; though, as he observes, "such an application of the hind legs is a singular anomaly, and not easily to be explained, without having had a more favourable opportunity of watching. their mode of life." For ourselves, we are very doubtful on this point; the true jerboa does not use its hind legs for such a purpose, nor the viscacha of the pampas of South America. Connected with the creature's leaping mode of progression, we imagine their service is especially needed in ascending the steep sides of the mountains, where it delights to dwell, and where it digs its subterraneous abode.

That they assist, however, in throwing out the loosened earth may well be believed, and for such an operation they could not be better constructed. On his second visit to Asbestos Mountain, Burchell says, "many burrows of the spring haas (leaping hare) attracted our notice. These animals, making their holes in soft sandy ground, were said to derive great assistance from their hinder feet, in throwing out the sand, which they loosen with their fore-paws; and which, as the nails of these paws have so little appearance of being worn, may perhaps be the only reason why they have been supposed to dig only with their hinder feet; a supposition contrary to my own opinion." The idea, however, is truly this; that the animal digs the soft sand with its fore-paws, and throws or spurts it backwards with its hind feet, as we have seen done by the rabbit.

The leaping hare, (or spring haas of the colonists,) is nocturnal in its habits. During the day it lives in its deep burrow, secure from the attacks of the sanguinary prowlers which infest the precincts of its retreat. All night it comes forth to feed; night, indeed, is the season of its active existence, and hence, abundant as it is, it is seldom seen, though the ravages which it makes in the neighbouring fields of grain betray its existence, and prompt the peasants to its destruction. Where the leaping hares are numerous, in the proximity of cultivated corn lands, their depredations (like those of hares in our own country) are productive of serious injury; they devour the corn both green and ripe. On the dawn of the morning they break up their revels, leap away to their rock-girt places of refuge, and wait in undisturbed repose till evening again shall summon them to their feast.

In the elevated situations where the leaping hare chiefly takes up its abode, it must often experience a considerable degree of cold, and that for several months in succession; it is not, however, ascertained whether it hybernates in winter, nor whether, like the hamster, (*cricetus*,) of northern Europe, it hoards up a magazine of provision.

This interesting animal inhabits the sides of the rocky mountains of the greater part of southern Africa. One species only is known; we are not aware of its having ever been brought alive to England, nor indeed are specimens of it common in museums. M.

## THE PRISON VAN.

I STOPPED one afternoon outside a police-office of our metropolis, to observe those who were about to enter the prison van. The first was a young lad, apparently sixteen years of age, who showed the utmost unconcern, and, laughing, uttered an oath as he received some beer, handed to him by one of his associates in crime, a lad of his own age. Here was a sad instance of juvenile depravity. O that youth would more cautiously attend to the advice of Solomon, "My son, if sinners entice thee, consent thou not." Let the young readers of the Weekly Visitor, be warned from this circumstance, and let them remember that they are not too young to be led into sin by the snares of wicked companions. The second was a young man, decently dressed, who, in a fit of passion, caused by intemperance, had so cruelly used a fellow-apprentice, for some slight provocation, as to endanger his life. His eyes were red and swollen, and his hand greatly trembled as he stepped into the van. A neatly dressed young female was in the crowd, who appeared in as much grief as the criminal, who was her brother. I learnt that this young man's sentence would be transportation for life, and that he might consider himself leniently dealt with if he escaped the extreme punishment of the law. This, thought I, is an instance far more deplorable than the former. Young men, exposed to the temptations of intemperance, beware! do not be led away by any idea that ardent spirits can strengthen or invigorate you: on the contrary, they only excite to weaken; they create passion, and may lead you into the same awful circumstances as this young man.

The next was a middle-aged female, who had lived in respectability as housekeeper to an old gentleman for many years. She had been tempted to commit some petty act of theft; this was at length succeeded by a robbery of the old gentleman's property to a great amount, in which she was the principal. Her abettors escaped, and she is now on her way to banishment for life, in an unknown and foreign country, as a felon.

The other was a dirty-looking man; his hoary hairs bespoke his advanced age, while his hardened brow told a tale, sad but too true, that he was also far advanced in crime. I learnt that he was in the constant habit of seducing children from the streets, and sending them out to commit robbery where and whenever they could.

Surely, thought I, as I turned away in horror from scenes like these, it is bad enough to see a young offender; but what can we say for the hoary-headed man, who ought to have learnt wisdom from his own and others' experience? What can we say for him who, instead of devoting his years to the good and the advantage of the young, employs them to corrupt, contaminate, and ruin youth?

Let, then, the readers of the Weekly Visitor, while such affecting scenes as these are held up to their view, endeavour more and more to seek the aids of Divine grace, to avoid the paths of sin and folly, and to employ the talents they possess for the glory of God, and the good of mankind; that at last they may be able to render a good account of their stewardship. P. H.

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## NATIONAL PARTIALITIES.

THE editor of the "Chinese Repository," published at Canton, observes:—

All those who are familiarly acquainted with the people of China, Great Britain, and the United States of America, may frequently have observed in each a strong inclination to extol themselves. The foreign resident here sees this disposition exhibited by the Chinese in no dubious manner, and on numerous occasions. This feeling is cherished by parents and teachers, and by them it is communicated to the rising generation. The stranger, who visits England, and becomes familiar with the people of that country, will observe wherever he goes, more or less of the same disposition; and if he cross the Atlantic, he will there also find it producing the same effects as in England and China. We will not undertake to say in which of the three nations this partiality exists in the greatest degree: it will suffice for our present purpose to notice its existence, and point out some of its bad effects. In order to bring the subject the more distinctly to view, we will cite the opinions of a few, who may serve as the representatives of many.

We will give the opinions of one from each of the nations named above, and in their own words: commencing with the

### CHINESE.

"I felicitate myself that I was born in China, and constantly think how very different it would be with me, if I had been born beyond the seas, in some remote part of the earth, where the people, far removed from the converting maxims of the ancient kings, and ignorant of the domestic relations, are clothed with the leaves of plants, eat wood, dwell in the wilderness, and live in the holes of the earth: though born in this world, in such a condition, I should not have been different from the beasts of the field. But now, happily, I have been born in the middle kingdom: I have a house to live in; have food and drink, and elegant furniture; have clothing and caps, and infinite blessings. Truly, the highest felicity is mine."—*Teen Kesheih.*

### ENGLAND.

"No cloud in summer was ever more fully surcharged with electricity than England is with moral energy, which needs but a conductor to issue out in any given direction. England has become the capital of a new moral world: the eminence on which intellectual light strikes before it visits the nations; the fountain-head of the rivers that are going forth to water the earth: and it is at her option to have well-wishers in every country. * * * * The power and the resources of Britain, pent up at home, will spread themselves as wide as the winds and waves can carry them, and will cause the branches of English population and literature to spread over every soil. Every country will be prepared for the reception of English as the standard of literature, and the medium by which it may be transmitted or promoted, when they feel the superiority of the English brought home to them in all the productions of life, and in the value which their industry confers upon every species of manufacture; but, above all, England has shot ahead of all other nations, and is more rapidly carried along by the current of events, and the influence of the times, and has anticipated those changes and meliorations, of which other nations begin to feel the necessity; and those improvements in which they all acknowledge her to be their precursor and model: this priority of progress, and the belonging, as it were, to a more advanced age, will contribute to the eagerness with with all nations will be brought to the study of English, as the key to modern discoveries, and the storehouse of those truths which are to be beneficial to mankind."—*James Douglas.*

### AMERICA.

"And now, let us indulge an honest exultation in the conviction of the benefit, which the example of our country has produced, and is likely to produce, on human freedom and human happiness. And let us endeavour to comprehend, in all its magnitude, and to feel in all its importance, the part assigned to us in the great drama of human affairs. We are placed at the head of the systems of representative and popular governments. If, in our case, the system ultimately fail, popular governments must be pronounced impossible. No combination of circumstances more favourable to the experiment can ever be expected to occur. The last hopes of mankind, therefore, rest with us; and if it should be proclaimed, that our example had become an argument against the experiment, the knell of popular liberty would be sounded throughout the earth. * * * * Let us, then, cultivate a true spirit of union and harmony. In pursuing the great objects, which our condition points out to us, let us act under a settled conviction, and an habitual feeling, that these twenty-four states are one country. Let our conceptions be enlarged to the circle of our duties. Let us extend our ideas over the whole of the vast field in which we are called to act. Let our object be 'our country, our whole country, and nothing but our country.'"—*Daniel Webster.*

Who is there that does not know that all the nations of the earth are of one blood, and the workmanship of one hand? In the best sense of the word, therefore, they are "brethren." What then ought to be their feelings, and their conduct towards one another? For the Chinese, and others like them, there may be some shadow of excuse for treating others as barbarians, (though in fact there is nothing that can free them from guilt in this case;) yet who will undertake to justify those who know and are bound by the rule of the New Testament, "Thou shalt love thy neighbour as thyself?"

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## BOTANY.—No. XX.

### MALVACEÆ.

This family, though bearing a humble denomination, taken from the *malva sylvestris*, or common mallow, embraces a magnificent and an extensive array of plants and shrubs.

In our own country we have four or five species of the malva or mallow, of which the most remarkable is the musk mallow (*malva moschata*) denoted by its large red flowers and musky scent. On the sea-shores, the sea-tree mallow, (*lavatera arborea*) is sometimes met with; which is, in general appearance, so handsome, that it occasionally finds a place in our gardens.

A frequent ornament in salt marshes, is the marsh mallow, (*althæa officinalis,*) known by its straight tomentous or downy stems, and its large red flowers.

Under this genus, (*althæa,*) is now ranged the hollyhock, seen almost in every garden. It has been so long in a state of cultivation with us, that its native country is at present unknown. Should any one of the examples just glanced at be within reach, or the *hibiscus rosa sinensis*, that splendid inmate in some flowery enclosures, the inspection of a blossom, compared with the following outline, will be sufficient to impress upon the minds of the attentive a general notion of incidents which constitute a plant or tree a member of this order. The calyx is usually accompanied by additional leaves, which are sometimes very numerous, and serve to distinguish one genus from another. There is nothing remarkable in the form of the petals; but the curious manner in which they are folded up, while budding, will not fail to engage the attention, after it has been pointed out. The petals appear, in this state, as if any one had taken hold of the bud, and given it a twist with the thumb and finger. The manner in which the parts of a flower are applied to each other previous to expansion is called their æstivation, which, in the instance before us, is said to be spiral. The stamens are united into a tube, enclosing the pistil, and are seen running side by side, in a spiral direction, like the strands or threads in a rope. In fact, these form so obvious a character, as at once to strike the eye of the inquirer. Anthers, in most instances, have two cells, and open by two chinks, but, in the malvaceous family, they have only one cell, and open by a single transverse chink. The last essential is not so conspicuous as the rest, but a magnifier, and a little patience, will make the matter clear and intelligible. The seeds or seed-vessels, as they in all instances ought to be called, are ranged about a centre, like spokes in a wheel, which is easily seen by looking at the holly or the mallow, after the blossom has fallen off. The number and nature of these seed-vessels (*carpella*) assist us in discriminating the different genera. The internal structure of the seed is very curious; for the leafy portions are folded and doubled together in a most complicated manner.

If an artist was required to fold two thin sheets of paper, cut in a way to resemble a fire-screen, so that they could be stowed in a case a little bigger than a walnut, he would find the operation more embarrassing than a Chinese puzzle; not for want of room, but for want of knowing how to double the paper, so that no room might be wasted. But such an operation is performed in every seed belonging to this family. At first the seed is filled with nutritive matter, (*albumen*) and these leafy portions (*cotyledons*) very small; but as the albumen is absorbed, the cotyledons expand, and all the twistings and turnings which perplex the examiner, are only efforts which are made to adapt themselves to the case that contains them.

In reference to utility, we may mention, that several species of hibiscus furnish materials for cordage, in their tough fibrous bark, which the writer often saw applied to that purpose in the islands of the South Seas. But to show, by one instance, that this order has a claim upon us for its usefulness, we need only say, that the *gossypium indicum*, whose seeds are wrapped in that snowy tomentum, or down, which yields the material spun into cotton, is a member of this family.

### EXTRACT FROM JOHN FOX ON PRINTING.

Almighty God, in his merciful providence, seeing both what lacked in the church, and how also to remedy the same, for the advancement of his glory, gave the understanding of this excellent art or science of printing, whereby three singular advantages at one time came into the world: first, the price of all books is diminished; secondly, the speedy help of reading more furthered; and, thirdly, the number of all good authors enlarged.

### OLD HUMPHREY ON USING AND NOT ABUSING THE THINGS OF THE WORLD.

It sometimes happens that, in reading the word of God, Old Humphrey meets with a text that seems exactly to suit the case of some neighbour or friend. It reproves an error, or consoles an affliction, that wanted just such correction or consolation; and then Old Humphrey is quick to apply it. If the text be a rebuke, he takes it up, and applies it to others. If it be a cordial, he pours it out with a willing hand and heart. This is an occurrence that not unfrequently takes place.

It happens, too, at times, and, perhaps, as often as the other case, that Old Humphrey meets with a text that seems written on purpose for himself. It comes like a sharp arrow, aimed at one of his own faults, or, like the voice of a faithful friend and counsellor, to direct him in a season of difficulty. I have just been reading a chapter in Corinthians, wherein are the words, "And they that use this world, as not abusing it; for the fashion of this world passeth away." Now, who is he that uses the things of this world without abusing them? Whoever he may be, I feel at this moment that he is not Old Humphrey. The words, therefore, come home to me; and, as it is possible they may come home to you likewise, let us give them a little consideration.

We need not trouble our heads about the unlawful things of the world, because we are not permitted to use them at all without disobedience and sin. When we meddle with them it is all abuse, when we touch them it is all defilement. The lawful things of the world are those which we will consider.

We may venture to lay it down as a rule, that when our earthly desires darken our heavenly hopes; whenever the love of any created thing lessens our love to God and his Son Jesus Christ, that we are not merely using, but that we are also abusing the things of the world. And now, then, to this standard let us bring ourselves.

Dear as our relations and friends may be, they are too dear when they draw our hearts from God. How is it with you? do you use these good things without abusing them? Is there no wife, no husband, no child, no friend, that has an undue portion of your affection? Are none of these idols that interfere with the supreme, unmingled devotion of your hearts to the King of kings and Lord of lords? This is a home question; but it shall be put as plainly to Old Humphrey as to yourselves.

How is it with you, as to your worldly possessions? Can you commit yourselves and all belonging to you, without anxiety, to Him whose are "the silver and the gold, and the cattle on a thousand hills?" or are you labouring unduly to add shilling to shilling, pound to pound; field to field, and house to house? Does the love of money, and what money will obtain, never enter into your heart, and render you, for a season, more desirous to get the gold that perishes here, than the treasure that will endure for ever?

Are you quite sure that you are using what you possess of this world's wealth, and not abusing it? This question ought to be answered honestly and faithfully, not only by you, but by Old Humphrey.

To what use are you putting your health and strength, your reputation and influence in the world? for these ought not to be abused. Are you employing them for mean and selfish ends, or devoting them to high and holy objects? The fashion of this world passeth away, and you are passing away, too, and should, therefore, while you possess them, promote the glory to God in the highest, and goodwill among mankind. Is this, then, the case? I ask you, and I also ask Old Humphrey.

It is a much easier thing to ask such questions, than to reply to them; and yet the reply is as necessary as the question. The sun, the moon, and the stars, that so gloriously adorn the heavens; the mountains and valleys, the fields and the foliage, the fruits and flowers, that beautify the earth, are grateful to look upon, and the Father of mercies has given us intellect to enjoy them, but are we using or abusing this intellect? Do we regard these created things as the express workmanship of God, and seek, through a knowledge of them, to glorify him more, whose goodness and whose mercy endureth for ever? or do we merely regard them as beautiful objects of the creation, calculated to afford us pleasure? What is your reply, and what is the reply of Old Humphrey?

How are we using our time? Not our years, our months, our weeks, and our days only, but our hours, our minutes, and our moments; for moments are more precious than diamonds. How are we using our time? What is called a long life soon runs away; and a short one is short indeed. You may not have so many grey hairs on your head as Old Humphrey, but your lives are uncertain like his. However profitably we may appear to be using our time, we are abusing it, and spending it unprofitably, if therein we are not preparing for eternity. Let the question be repeated, then, till it tingles in our ears, How do you use your time?

How do we use the losses and crosses, the trials and afflictions of the world? for these are among the good things that we ought not to abuse. Do we allow them to sour our temper, to make us despond and repine? Do we complain that God deals hardly with us; or do these things render us more humble, dependent, prayerful, and thankful? Can we, and do we thank God that we have been afflicted? If we can, we are using, but if we cannot, we are abusing what ought to be a blessing to us. Let us, at least, be close and honest in putting the inquiry to our hearts.

If "the fashion of this world passeth away," there is the greater need to be preparing for another. How are we using our sabbaths, and our sabbath sermons? How are we using our hours of reflection, and seasons of devotion? Are we using them, as especial mercies, vouchsafed to us for especial purposes? or abusing them by a worldly, cold-hearted, and selfish participation of the benefits they afford? If we could answer this inquiry in a satisfactory way, it would be well for you, and equally well for Old Humphrey.

To sum up the whole matter. Is every faculty of our bodies and our souls devoted to God? Is every thing we possess considered as His, and not as our own? Do our gains and losses, our pleasures and our pains unite us more closely to him? In one word, do we use the things of this world, by regarding them as helps to heaven, or abuse them by allowing them to enchain our hearts and affections to the earth? No questions can be put plainer than these have been put to you, and they have not been put plainer to you than to Old Humphrey's own heart.

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## LORD AND LADY CHESTERFIELD.

Lady Chesterfield was born to wealth, and allied to a rich and noble house, was fitted to make a distinguished figure among the great, and to shine at court. Her various accomplishments attracted general admiration; and she was for many years fascinated with the splendour and allurements of high life, which seemed to absorb all her thoughts, and gratify her utmost wishes. But it pleased God to lead her to attend the preaching of that man of God, Mr. Whitefield, at the Countess of Huntingdon's house, and to convince her that no situation, however high and elevated, can secure to its possessor uninterrupted felicity, and at the same time exhibited to her view the source of true and permanent happiness. Lady Chesterfield knew the world too well not to expect its hatred and reproach for a zealous and consistent profession of the faith once delivered to the saints; but the grace of Jesus rendered this of small consequence in her estimation, enabling her, with all worldly pleasures at her command, to cast her fortune, her honours, and her talents at the foot of his cross. In compliance with the wishes of Lord Chesterfield, her ladyship sometimes went to court, and mixed with the gay and thoughtless; but found no pleasure in the fashionable follies of those around her. The last time she visited the royal circle, she was dressed in a manner so plain as to excite the attention and ridicule of many of her gay acquaintances. Her ladyship had a suit of clothes on with a brown ground and silver flowers, which Lord Chesterfield had obtained from the continent at a considerable expense. His Majesty, who it seems was well acquainted with the proceedings at Lady Huntingdon's, coming up to Lady Chesterfield, first smiled, and then laughed quite out. Her ladyship could not imagine what was the matter. At length his Majesty said, "I know who chose that gown for you—Mr. Whitefield; and I hear you have attended on him this year and half." Lady Chesterfield replied, "Yes, I have, and like him very well;" but after she came to her chair, was grieved she had not said more, when she had so favourable an opportunity.

Lady Chesterfield frequently prevailed upon the earl to accompany her to Lady Huntingdon's, with the hope of his being led to embrace those blessed truths, which she had proved to be the power of God to the salvation of her own soul.

"On Tuesday," says Mr. Whitefield, "I preached twice at Lady Huntingdon's to several of the nobility. In the morning the Earl of Chesterfield was present; in the evening, Lord Bolingbroke. All behaved quite well, and were in some degree affected. Lord Chesterfield thanked me, and said, 'Sir, I will not tell you what I shall tell others, how I approve of you,' or words to this purpose. He conversed with me frequently afterwards.

Lord Bolingbroke was much moved, and desired I would come and see him the next morning. I did; and his lordship behaved with great candour and frankness. All accept of my sermons, and seem surprised, but pleased."

It appears Lady Huntingdon had at times some favourable hopes of Lord Chesterfield. In a letter to Dr. Doddridge, written at the same period as the above, she says:—

"I must just tell you that I have had two large assemblies at my house, of the mighty, the noble, the wise, and the rich to hear the gospel by Mr. Whitefield; and I have great pleasure in telling you they all expressed a great deal of pleasure in hearing him. Sometimes I do hope for even Lord Chesterfield, and Lord Bath, Mr. Stanhope, and one of the privy council of Denmark, with a great many ladies and people of fashion, as well as of quality. I know your warm heart will rejoice at this, and your prayers will help with ours for an increase to our blessed Lord's kingdom, even among these."

Had the preaching of Mr. Whitefield been attended with any lasting effects on the mind of this votary of flattery, he might, perhaps, have been spared some of those gloomy and heart-appalling reflections which made the close of his days bitter to him. Instead of looking upon his entrance upon another state of existence as "a leap in the dark," Lord Chesterfield might have left the world, which he had so long and so faithfully worshipped, with a hope blooming and full of immortality, exclaiming, "Though I walk through the valley of the shadow of death, I will fear no evil: for thou art with me; thy rod and thy staff they comfort me." "O Death! where is thy sting? O Grave! where is thy victory?" The latter years of his life wore a cast of melancholy, and almost of despondency. His excellent sister, Lady Gertrude Hotham, frequently visited him during this period, and with mingled fidelity and tenderness set before him those solemn truths which can alone chase away the gloom of the most dejected mind, and fill it with that joy which is unspeakable and full of glory. She persevered in her exertions, till he put a prohibition on her addressing him on those subjects, which seemed to harrow up every remaining feeling that he possessed. He lived, with increased infirmities, to the 24th of March, 1773; and in his last moments exhibited a melancholy picture of a mind destitute of the only effectual support under natural decay and pain. No attack of an enemy could have degraded his character so much as the publication of his "Letters to his Son;" which, if they do not quite deserve the severe reprehension of Dr. Johnson, that they "inculcated the morals of a strumpet with the manners of a dancing master," certainly display a relaxation of principle, for which no talents can make amends, and which proved him to have been a man in whose mind the applause of the world was the great, and almost the sole, governing principle. His amiable countess survived him but a few years. She died September 16, 1778, without issue; whereby her titles are extinct.—*Evangelical Register.*

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### THE LOVE OF GOD.

No where doth the incredible love of God towards miserable sinners more evidently display itself than in Jesus Christ, which is suited to melt the heart frozen even into ice, and to kindle into ardent flames of mutual love; for the love of Christ constraineth us, 1 Cor. v. 14, 15. Who, swallowed up by the meditation thereof, doth not cry out, "Art thou, O most loving Jesus, scorched no less with love to me than with the flames of Divine wrath against my sins? and shall I grow lukewarm in my love to thee again? Hast thou died for my salvation, and shall I not live to thy glory? Didst thou deliver thyself to be tormented, and shall I not give up myself to thee, to bear thy yoke which is light, and thy burden which is sweet?" It is inexpressible how the pious soul, intent on such meditations, is displeased with its own lukewarmness; desiring and wishing for itself, that a mind a hundred times more capacious might be given, that it might be wholly filled with the love of Christ. Psa. cxix. 32.—*Witsius.*

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### SARDONYX.

This is a precious stone; probably named from its likeness to both the sardius and the onyx. It is dark, variegated with bluish white, black, and red, lying in circles, as if inlaid by art. It is only mentioned in Rev. xxi. 20; appearing to be the fifth row of stones on which the heavenly city in John's vision seemed to rest.

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# WEEKLY VISITOR.

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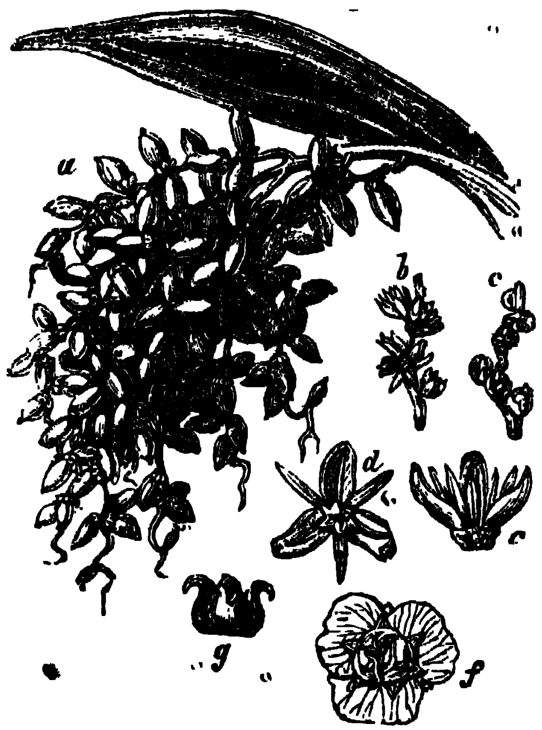
THE DATE PALM.—PHŒNIX DACTYLIFERA.

Of all the trees which have adorned the pages of history and poetry, the date palm stands pre-eminent. It has lent its name to a magnificent and multiform order of trees, which, though differing from each other in the structure of their fructification, are grouped together under the common appellation of *palmæ*, or the palms. Nor is the palm more distinguished in history, than conspicuous in the forest; for while in the distant landscape the other trees lose their particularities in one continuous surface of undulating verdure, the eye singles out the "noble palm," that rears its lofty tuft over the wild waste which spreads around it. It is from this circumstance in its history, that the palm, with that elegance of choice for which the ancients were so remarkable, was selected as the appropriate emblem of victory and distinction. On the ancient coins we often see the palm branch, or more properly speaking its leaf displayed, sometimes in the hand of a genius, or the allegorical figure of a city, at others placed in those beautiful representations of urns which form the highest decoration of antique medallions.

In the latter instance a palm leaf, set in an urn, denoted some kind of public games, in which the candidates contended for the mastery. The Roman coins often exhibit, especially those struck in the time of Hadrian, types or symbolic representations of cities and countries, which were female figures, with a picture of that production for which the country was most remarkable. As, for example, Alexandria is represented by a female with some ears of corn in her hand, to denote the abundance of choice grain produced in that neighbourhood. While Judea is intimated by the similitude of a palm tree; since it was noted as the region of palm trees. And it is not unworthy the attention of the christian reader, that the well understood symbol of victory thus represents a country whose inhabitants were Israelites, to whom "pertaineth the adoption, and the glory, and the covenants, and the giving of the law, and the service of God, and the promises; whose are the fathers, and of whom, as concerning the flesh, Christ came, who is over all, God blessed for ever. Amen."



(a, cluster of fruit; b, barren flowers; c, fertile flowers; e, barren flower; d, when opened displaying six stamens; g, three fruits of one flower in their early stage; f, fertile flower with six imperfect stamens.)

In the date palm, the barren and productive flowers occur in different trees. In the barren tree, the expanded clusters of flowers are wrapped up in a simple sheath of leathery texture, which, by bursting on one side, makes way for the emergence of the flower. The calyx, or the leaves that compose the flower, are, as usual in the palms, six in number. The stamens, or the threads, which are surmounted by heads or anthers replete with fertilizing dust, are six. In the fertile, or fruit-bearing flowers, there are also six leaves, forming the calyx or perianth. The fruit, or date, is superior, that is, placed above the point at which the calyx and the stamens grow. Into a small ring, at the base of the fruit, the stamens are inserted; and they, in the early stages, compose a small circle of palisades about it. All the palms bear a fruit which partakes more or less of the drupaceous character, by which we understand a nut placed within a pulpy or softish substance.

In the date palm the shell is remarkable for its membranous or filmy texture; which may be split into threads adhering to the fleshy pulp at the top and bottom. The fruit is ripened in clusters of prodigious size, and in various parts of the east it forms one of the staple articles of diet. It is gathered with particular care and ceremony, expressive of that dependence which man has upon it for his subsistence.

The palm is of tardy growth, but in process of time it reaches to a great height. The trunk is single, as in all other palms, with one exception, the urna palm of Egypt, and is roughened by the scars of fallen leaves.

The natives of the South Sea islands often ascend the cocoa-nut trees by embracing the stem with their hands, while the feet advance from ring to ring; but in the palm, the many eminences upon the trunk, in addition to the rings, offer a natural ladder of very easy ascent. In the illustration at the head of this article, these inequalities are strongly represented. The apparent ease with which the Pitcairn Islanders climbed the cocoa-nut tree, tempted the writer of this paper to try the experiment; but it proved easier in theory than in practice, and showed the superiority of early habit, when impressed upon us by the calls of necessity.

The tuft of leaves which form the beautiful and stately crown of the palm, exemplifies the unceasing bounty of Heaven; for, as fast as the outer leaves fall off below, fresh ones sprout forth at the top, so that we have an uninterrupted pedigree of leaves: like the generations of men, the old ones die away, and younger ones grow up to fill their places. From the bosom of each of these leaves a sheath protrudes itself, which in time bursts and discloses a large cluster of flower-buds. The pollen-bearing flowers disperse their fine powder in that vast repository of seminal life, the atmosphere, for the use of the fertile tree, while the latter, after receiving this necessary help to vivification, ripens its clusters into thickly studded bunches of a wholesome and agreeable fruit.

The notion alluded to by Plutarch, that the palm rises with accelerated force against any weight that can be placed upon it, seems to have arisen from observing that while other trees bend their boughs under the swelling harvest of yellow autumn, the palm still continues to ascend higher and higher, unchecked by the cumbrous load of fruit that clusters about its top.

In Psalm xcii. 12, it is said that "the righteous shall flourish like a palm tree." The good man is thus likened to a tree, which in stature soars above all the inhabitants of the forest, is ever crowned with leafy honours of reviving green, and surpasses all other trees in value and utility.

The palm selects those little spots in the sandy waste, which are rendered fertile by a spring of water, so that the appearance of a palm tree becomes an indication to the way-worn traveller that some refreshing draughts are at hand, which may be obtained by digging a short depth below the surface of the earth. This well-known fact illustrates what we are told in Exod. xv. that when the children of Israel came to Elim, they found twelve wells of water, and seventy palm trees; where, exhausted with drought, labour, and impatience, they pitched their camps, and experienced one of the most pleasing vicissitudes to be found in the sphere of earthly enjoyments. It has grown into a maxim among travellers, that "where you see a palm tree, there you will find water, if you take the pains to dig for it." When at the island of Bonin, a few days' sail from Macao in China, the writer inverted this rule in reference to the cabbage palm. For in quest of the delicious vegetable, which consists of the budding and unexpanded leaves and flowers borne at the top of the tree, various foraging parties were sent by the different messes on board of one of his Majesty's ships, who wandered at large through the woods with little success. The writer met one of these parties who were complaining of their ill luck: he advised them to follow a stream of water, and not to diverge fifty yards from its banks. As this was the only stream on that side of the island, nearly all the palms growing there were found by this party, while the others found nothing except when any one happened unthinkingly to approach the stream.

L.

## INCONSISTENCY OF INFIDELS.

The Rev. Mr. Carlile of Dublin says:—There are two objections which are sometimes brought against the Scriptures, which seem to neutralize one another. When the minute and affectionate interest which the Bible represents the Deity as manifesting in the affairs of mankind is to be discountenanced, the world is reduced to a mere speck in creation, altogether unworthy of his particular regard. But if any of those miracles recorded in the Bible are to be disputed, which imply absolute power over this our planet and the whole planetary system, the world assumes an extraordinary importance; the arresting its rotatory motion, or turning it back into another direction, or even the drying up of a few fathoms of water on the surface of it, not amounting to one hundred thousandth part of its diameter, are represented as operations on so extensive a scale as to be altogether incredible.

Both of these objections are equally inconsistent with the modern principles of philosophizing. If God be infinite, and the world or the universe be finite, the comparative bulk of any part of the universe can never have any value in any calculation in which his power is concerned. A universe and a point bear the same proportion to him. It is as easy for him to change the motion of a world as of a gnat: to dry up an ocean as to exhale a drop of dew. He is as intimately acquainted with a nest of ants as with the solar system, and takes as deep an interest in the welfare of each in proportion to their respective value. We have a right, therefore, to demand that a man who adheres to either of these objections, shall, at the same time, abandon all science which is founded on mathematical demonstration.

## ON THE TELESCOPE.—No. I.

It is more than probable that from the earliest period of human existence, the magnificent spectacle of the heavens, bespangled with brilliant orbs, attracted the attention of mankind. The regular vicissitudes of day and night must early have led him to observe the path of that great luminary, the "ruler of the day," with whose oblique annual course he would soon learn to identify the variety and succession of the seasons. As population increased, the cultivators of the soil sought and obtained some knowledge of the celestial motions, that they might with certainty determine both the "seed time and the harvest." In pastoral life also, such knowledge would be found essential to regulate the migrations of the shepherd; and history informs us that the Chaldeans, enjoying the leisure of such a life, with the facilities of the spacious and unclouded horizon of their native plains, were among the foremost in observing and recording the more striking of the celestial phenomena.

It has been said, that "an undevout astronomer is mad." And if our remote ancestors of the earliest ages could find, "in looking through nature up to nature's God," their hearts warmed, and their devotional feelings increased with every new accession to their knowledge, which must necessarily have been acquired with unassisted vision, what must have been the feelings of astonished and pious excitement, in him who first directed that wondrous instrument, the telescope, to the starry heavens! It imparts a range of ken more than possessed by eagles' eyes, and exhibits to our finite powers a magnificent view of the immensity, the beauty, and the harmony of that universe, of which the world we inhabit forms so insignificant a member. And experience teaches us, that the boundary of our vision thus extended, lies nowhere but in the imperfection of our telescopes; for who can say how far the universe extends, or where are the limits of it?—where the Creator stayed "his rapid wheels," or where he "fixed his golden compasses?" That man is little to be envied (be his acquirements or possessions what they may) who can with a cold indifference view these wondrous scenes; more especially if, understanding the nature and constancy of the celestial motions, he cannot both feel and acknowledge that "the heavens declare the glory of God, and the firmament showeth his handywork."

It is our present object to bring before our readers a familiar account of the principles of that instrument by which our faculty of vision is so much assisted; and after explaining the shape and arrangement of those glasses which constitute the telescope, and in that form produce such remarkable effects, we purpose introducing, by way of illustration, a short descriptive account of those celestial bodies and appearances with which we become acquainted by its means.

The glasses employed for optical purposes are denominated lenses, and are formed by the process of grinding into the following figures,

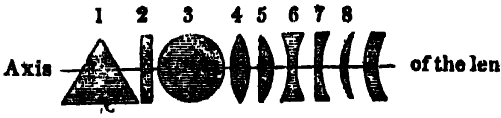


Figure 1. Represents a prism as viewed end-wise, and is in shape like an equilateral triangle.

2. A plane glass, which is perfectly flat on both sides, and of equal thickness in all its parts.

3. A spherical lens, or perfect globe, all the points on its surface being equally distant from its centre.

4. A double convex lens, which is a solid piece of glass, having two convex spherical surfaces, each in shape like the outside of a watch-glass.

5. A plano convex lens, which is flat on one side and convex on the other.

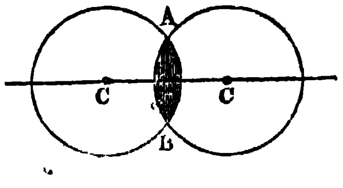
6. A double concave lens, which is concave (or hollowed out like the inside of a watch-glass) on both sides, and may be equally or unequally concave.

7. A plano concave lens, which is flat on one side and concave on the other.

8. A meniscus, which is a lens, one of whose surfaces is convex, and the other concave. As the convexity exceeds the concavity, it may be regarded as a convex lens.

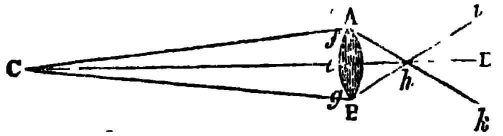
9. A concavo-convex lens, which also has one of its surfaces convex and the other concave, but as the concavity exceeds the convexity, it may be regarded as a concave lens.

An imaginary line passing through the centres of the curved surfaces, and perpendicular to the plane surfaces of lenses, is called their axis: thus, in the figure below, let A B represent a double convex glass, the surfaces being segments of the two equal circles, then a line passing through the two centres C C of the circles would be called the axis of the lens; the same holds good of all the other lenses, as shown in our former figure.



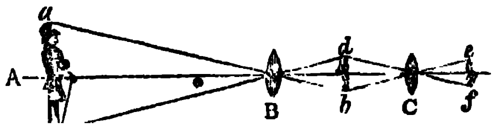
The peculiar properties of such of these lenses as are more immediately connected with our subject, in the refraction of the rays of light, (that is, bending the rays, or causing them to change their course,) we shall now explain.

It must be premised that rays of light proceed in straight lines, but are diverted from their course, or refracted, as it is termed, when they pass from one medium to another, as shown by the following familiar instance:—A straight stick when partly immersed in water, appears to be bent upwards, at the surface of the fluid; which is an optical deception, and arises from the rays of light being bent or changed in the direction of their course, as soon as they reach the surface of the water, in passing out of it. The density of the water being so much greater than that of the air, is the cause of this great refraction, and produces the apparent distortion of the stick.



Let us now consider the refraction of rays by a convex lens, which suppose to be A B in the figure below, whose axis is in the direction of the straight line C D, and let there be an object at C, which imagine to be at a great distance from the lens. This object diffusing rays of light in all directions, some of them will pass through the lens A B, as C *e*, C *f*, and C *g*, of which C *e* in the direction of the axis of the lens will suffer no refraction, but continue the same rectilineal course towards D. The other two rays C *f* and C *g* (as well as all intermediate rays) in passing through the lens nearer the edge, will be so refracted both at entering and departing, that they will afterward meet the axis, as at *h* the focus of the glass, where they will (if not intercepted) cross each other's path, and continue in the same straight lines B *i* and A *k*. The rays of light C *f* and C *g* would, if no lens had interfered, have continued onward in the direction they first had; but undergoing refraction at A B, they are compelled to change their directions, and proceed as if they had emanated from the point *h*, where an image of the object C would be formed. If a piece of ground glass, transparent paper, or a plate of glass having one surface covered with a dried film of skimmed milk, be held up at *h*, a person looking at it from D a few inches behind the glass, would distinctly see a perfect image of the object C formed on the ground glass, and by steadily keeping the eye in the same position, the ground glass may be removed, and the image will appear in the same spot suspended in the air. What an astonishing effect is thus produced by a convex lens! the object supposed to be very remote at C, is suddenly transported as it were to *h*, from which the eye must undoubtedly receive a very different impression from what it would do if, withdrawing the lens, it were to view the object C immediately.

The focus *h*, where the image of the distant object is formed, has a remarkable property; and we shall digress in this place to speak of it. Suppose the sun to be the object at C, the rays which fall on the lens are all collected at *h*, and being endowed with the quality of heating, it is natural that the concourse of so many rays at one point should produce a degree of heat, capable of setting on fire any combustible matter that might be placed there; hence a convex lens is commonly denominated a burning glass. The image formed at the focus *h* will be an inverted image of the object C, as will readily be understood from the following figure.



Suppose the man at A was observed through a lens at B, the rays which fall upon the lens will, as before stated, be refracted, and form an image on the other side. We before had occasion to remark, that those rays which pass through the centre of the lens in the direction of its axis, suffer no refraction; the same is true of all rays which pass through the centre, whether they fall upon the surface in the direction of the axis or otherwise, because the opposite surfaces in the direction of such rays are parallel to each other. Therefore the image of the man's head must be formed in the line *a b*, which is the direction of the ray passing from the crown of his head through the centre of the glass, and that of his feet in the line *c d*, forming an inverted image of the man.

The image *d b* may now be considered a new object, and by placing another lens at C, an additional *image* of this image would be formed at *e f*, exactly in the same manner as if *d b* was a real object. But since the new image must be inverted with respect to *d b*, it will be an erect image of the object or man at A; so that by using one or more lenses, direct or inverted images may be obtained at pleasure.

The reader may now form an idea of the method by which opticians cause the telescopes intended to view terrestial objects, to show them erect or in their natural position. But those constructed for astronomical purposes show them inverted; to the astronomer this apparent inversion being of no consequence, and as fewer glasses are placed in his telescopes, the objects appear brighter, (which is of greater importance to him,) the rays having less dense medium to pass through; for in every refraction some rays must necessarily be lost. And as the brightness of the object depends upon the quantity of rays which reach the eye, it is evident that the larger the lens, the more rays it will receive and transmit; consequently a telescope of large aperture must be the most desirable, especially for astronomical purposes.

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## SCRIPTURE EXPLANATIONS.—No. XXXII.

"He speaketh with his feet, he teacheth with his fingers."—Prov. vi. 13.

It should be remembered, that when people are in their houses, they do not wear sandals; consequently their feet and toes are exposed. When guests wish to speak with each other, so as not to be observed by the host, they convey their meaning by the feet and toes. Does a person wish to leave a room in company with another, he lifts up one of his feet; and should the other refuse, he also lifts up a foot, and then suddenly puts it down on the ground.

"He teacheth with his fingers." When merchants wish to make a bargain in the presence of others, without making known their terms, they sit on the ground, have a piece of cloth thrown over the lap, and then put each a hand under, and thus speak with the fingers! When the brahmins convey religious mysteries to their disciples, they teach with their fingers, having the hands concealed in the folds of their robes.—*Roberts.*

◆

## BOTANY.—No. XXI.

### GERANIACEÆ.

We are just going to take a passing view of a family of plants not less familiar to us than they are deserving of a more intimate acquaintance than it is commonly their lot to obtain among us. One of the most frequent ornaments of a cottager's window is a geranium, and of those flowers which variegate the borders of our domestic enclosures, some of the brilliant specimens of this sort form not the least considerable portion. Among the ordinary points of resemblance by which the members of this family are bound together, as by the common ties of affinity, we may notice, in the first place, the constant presence of ten stamens, with half that number of petals, that is, of coloured parts which are unconnected with each other. These stamens are united at their base by the mutual junction of the flattened filaments. The style or central pillar is usually prominent, and is ultimately prolonged into a beaked point, like the bill of a bird, or specially that of a crane; whence the plants have long since obtained the name of *geranium*, or cranesbill. The style terminates in five stigmata or rosy points, which descend down along the outside of this central pillar, and, at the base, are each of them enlarged into a seed-vessel, containing one seed. Hence, at the base, we find a circle consisting of five distinct protuberances; these finally separate, and are lifted up out of their original situation by the descending threads, which we have just described, as respectively a continuation of the *stigmata*, or rosy points. This operation of lifting up the seeds with their cases, is performed by the twisting of the threads, either in a spiral direction, like a screw, or by simply curling up like a lady's ringlets. The effect of these curious processes, is to place the seed in a favourable position for being wafted to a distance, by that general medium of distribution, the wind. If we look with an eye that covets instruction, at the flower-stem just below the calyx, we shall perceive, in some instances, a spur, and in all others, an enlargement on the upper side, which is hollow, and is extended various lengths down the flower-stem, so as to afford an auxiliary mark for specific distinction.

This whole family were once comprehended under one genus, geranium; but of late, it has been found more convenient for the purposes of study, to distribute the species known at present, into five genera, three of which may be distinguished, and exemplified in the following manner.

*Geranium.* All the stamens bearing anthers when the bud first opens, with a little gland at the base of each of the longer stamens. Seeds lifted by the coiling up of their supporters, which, in this position, resemble a spring. This genus will be exemplified by looking at the jagged cranesbill, (*geranium dissectum,*) very common by the road-sides, or by reference to the herb robert, (*G. robertianum,*) which is very often seen on ditch-banks under hedges. Its general resemblance to the geraniums in our pots, its pink red flowers, and beaked fruit, added to the strong disagreeable smell of its foliage, will not fail to denote it to the curious eye, while a close examination of its peculiarities will afford an agreeable lesson of botanical instruction.

*Erodium.* In this genus we miss the spur or tube in the flower-stalk. Of the ten stamens, five bear anthers, and five are barren, at the base of which latter five, we meet with five glands corresponding to them in number. But what is most likely to engage our attention is, the screw or worm-like twisting of the supporters, to raise the seed from its lodging below.

An example may be sought for in the hemlock cranesbill, (*erodium cicutarium.*) This plant may be distinguished by its divided wing-like leaf, its red flowers, which have the general likeness of the geraniums, and its strong smell: it is very common by road-sides. There will be no difficulty, either in finding or in recognising the hemlock-leaved cranesbill, since the similitude of the individuals is so striking, that to know one, is to know all, as far as recognition is concerned.

*Pelargonium.* Upper division of the calyx, running into a tube, which appears upon the flower-stalk, descending in a direction between the upper pair of petals, which form a pair differing in shape from the rest. The fertile stamens vary from four leaves to seven, while the supporters are beaded on the inner side, and twist spirally, to raise the seed from its lodging. Examples are to be found among all the garden varieties, which are originally natives of the Cape of Good Hope, but by the cultivator's skill they have been improved and multiplied by crossing, so that, oftentimes, in our greenhouses and conservatories, few plants make a more beautiful and conspicuous figure.

One of the oldest, and not the least attractive and beautiful, is the horseshoe geranium and its varieties, which bear the figure of that part of a horse's equipment upon the leaf. But as varieties are every day increasing, it would not suit our limits to give an enumeration. Some shown us the other day, of peculiar splendour, bore the names of individuals now living, distinguished both in military and civil stations.

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## THE HUMAN COMPLEXION.

Bishop Heber observes, "I thought it remarkable, that though most of the male Indian deities are of a deep brown colour, like the natives of the country, the females are no less red and white than our porcelain beauties, as exhibited in England. But it is evident, from the expressions of most of the Indians themselves, from the style of their amatory poetry, and other circumstances, that they consider fairness as a part of beauty, and a proof of noble blood. They do not like to be called black, and though the Abyssinians, who are sometimes met with in the country, are very little darker than they are themselves, yet their jest-books are full of taunts on their charcoal complexion. Much of this has probably arisen from their having been so long subjected to the Moguls, and other conquerors, originally from northern climates. India, too, has been always, and long before the Europeans came hither, a favourite theatre for adventurers from Persia, Greece, Tartary, and Arabia, all white men, and all in their turn possessing themselves of wealth and power. These circumstances must have greatly contributed to make a fair complexion fashionable. It is remarkable, however, to observe how surely all these classes of men, in a few generations, even without any intermarrying with the Hindoos, assume the deep olive tint, little less dark than a negro, which seems natural to the climate. The Portuguese natives form unions among themselves alone, or, if they can, with other Europeans, and yet have they, during a 300 years' residence, become as black as Caffres. Surely this goes far to disprove the assertion, that climate alone is insufficient to account for the difference between the European and the negro. It is true, that in the negro are other peculiarities to which the European colonists show no approximation, and which undoubtedly do not appear to follow so naturally from the climate, as that swarthiness of complexion which is the sole distinction between the Hindoo and the European. But if heat produces one change, other peculiarities of climate may produce other and additional changes; and when such peculiarities have 3000 or 4000 years to operate in, it is not easy to fix any limits to their power. I am inclined, after all, to suspect that our European vanity leads us astray in supposing that our own is the primitive complexion, which I should rather suppose was that of the Indian, half-way between the two extremes, and perhaps the most agreeable to the eye and the instinct of the majority of the human race. A colder climate, and a constant use of clothes, may have blanched the skin as effectually as a burning sun or nakedness may have tanned it. Thus, while hardship, additional exposure, a greater degree of heat, and other circumstances with which we are unacquainted, may have deteriorated the Hindoo into a negro, opposite courses may have changed him into the progressively lighter tints of the Chinese, the Persian, and the European."

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## EXPENSES AT ETON IN THE SIXTEENTH CENTURY.

Of the expenses incurred for schoolboys at Eton, early in the reign of Elizabeth, we find some curious particulars in a manuscript of the time. The boys were sons of Sir William Cavendish, of Chatsworth, and the entries are worth notice, as showing the manners of those days. Among the items, a breast of roast mutton is charged ten-pence; a small chicken, four-pence; a week's board, five shillings each, besides the wood burned in their chamber; to an old woman for sweeping and cleaning the chamber, two-pence; mending a shoe, one penny; three candles, nine-pence; a book, Æsop's Fables, four-pence; two pair of shoes, sixteen-pence; two bunches of wax lights, one penny; the sum total of the payments, including board, paid to the bursers of Eton College, living expenses for the two boys and their man, clothes, books, washing, &c., amount to twelve pounds, twelve shillings, and seven-pence. The expense of a scholar at the university in 1514 was but five pounds annually, affording as much accommodation as would now cost sixty pounds, though the accommodation would be far short of that now customary at Eton.—*Domestic Life in England.*

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## ENGLAND'S RESPONSIBILITY.

Mr. Robinson remarks, adverting to the fact of a confirmation being held in a place in India where, only a few years ago, the most revolting barbarities were practised, "I was mentioning to bishop Heber, how forcibly it had struck me, during the service, in that hall, where, a few years ago, the most savage tyrant received his miserable subjects, a christian prelate was now administering the solemn ordinances of our religion. He leaned his head on his hand, and burst into tears. 'How wonderful,' said he, 'is the providence of God, in the economy of his church! Never was any people entrusted with such a power of doing good as England now is! What a fearful responsibility rests on the government and its ministers; on the nation and all its children; and, above all, on our church and its rulers!' Such were the remarks made in the palace of the deposed Emperor of Candy on this memorable morning."

◆

Forgetfulness.—A wretch that is condemned to die to-morrow cannot forget it, and yet poor sinners, that continually are uncertain to live an hour, and certain speedily to see the majesty of the Lord, to their inconceivable joy or terror, as sure as they now live upon earth, can forget these things for which they have their memory, and which one would think should drown the matters of this world, as the report of a cannon doth a whisper, or as the sun obscures a poor glow-worm. Oh wonderful stupidity of an unregenerate soul! oh wonderful folly and distractedness of the ungodly, that ever men can forget—I say again, that they can forget eternal joy, eternal woe, and the eternal God, and the place of their eternal and unchangeable abode! when they stand even at the door, and there is but the thin veil of flesh between them and that amazing sight, that eternal gulf, and they are daily dying and stepping in!—*Baxter.*

◆

The Believer.—A believer's heel may be bruised, but his vital parts are out of reach, Zech. ii. 8, 1 John v. 18.—*Cole.*

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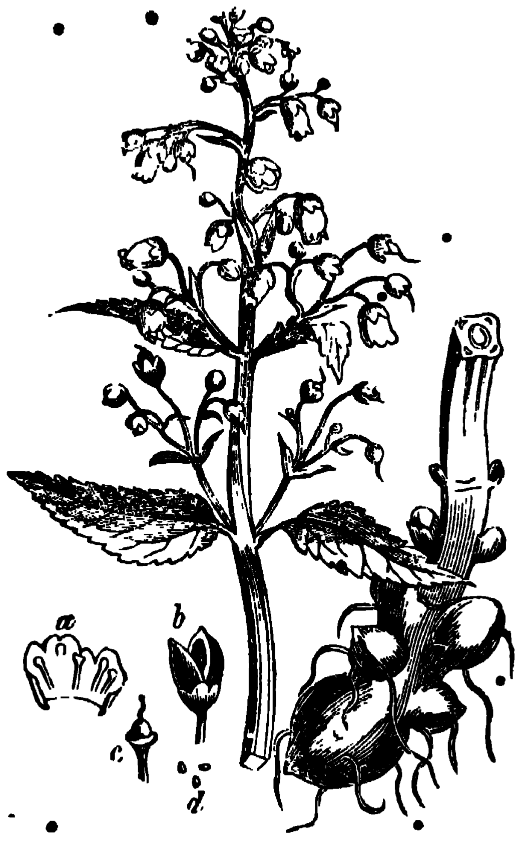

SCROPHULARIA NODOSA.

## BOTANY.—No. XXII.

### SCROPHULARIÆ.

To assist the mind in forming a conception of this family, we have introduced our brief account of it by a figure of the *scrophularia nodosa*, or figwort, which is assumed as the type and representative of the rest. The figwort is very common on the sides of ditches, and may, with the assistance of this figure, be easily detected by its deep-green leaves and its dark purple flowers. The root has a number of knot-like protuberances growing upon it, which, to an imaginative eye, bear some resemblance to the swellings which characterize scrophulous disorders; hence its Latin name scrophularia.

In this family the flower is of an irregular shape, fig. *a* In some instances it is so folded as to be likened to the visage of some animal, as we may see in the snap-dragon, often found growing wild upon old garden walls, or in the yellow toad-flax; in both of which names there seems to be some allusion made to the manner in which the corolla opens, as fancy might liken this to the mouth of a toad or a dragon. The stamens are, for the most part, four in number; in which case they stand inpairs of different lengths. There are occasionally only two stamens, as in the veronica of the gardens, the lady's slipper, and the various species of wild speedwell. The seed-vessel affords another mark of distinction. This is always divided into two cells or compartments, by a transverse partition, to which the numerous small seeds are attached. If the seed-vessel of the figwort, fig. *b*.

be examined after it has opened at the top, these two cells will be very obvious. If the partition itself be inspected, it will be found to resemble a small flattened pillow, connecting the edges of valves, or folding pieces, which compose the cells. Upon the nature of this partition the writer is disposed to rely, as forming an important distinction in this order.

It is by no means necessary that the student should begin the study of this order by an examination of the scrophularia nodosa; for the *digitalis purpurea*, or foxglove, which grows in almost every garden, will answer his purpose quite as well. This flower, whose hardiness and beauty have given it so frequent a place in our cultivated grounds, is a native of this country, not unfrequently found in woods. Its generic peculiarity consists in a bell-shaped corolla enlarged below, but the stamens are in pairs of two longer and two shorter ones, while the seed-vessel agrees with the general character just given of this order, in being two-celled, with a free partition in the centre.

A very pretty example for illustration is obtained in the *antirrhinum linaria*, or yellow toad-flax, known by its bright yellow flowers, and its narrow ash-green leaves. The blossom will be recognised by its resemblance to that of the snap-dragon; that is, in having the mouth of the corolla shut close, and resembling the mouth of some animal.

A very pleasing ornament of old walls is the *antirrhinum cymbalaria*, or ivy-leaved toad-flax, which we mention both for its beauty and the likelihood there is that it will be at hand when other examples are absent. A small violet-coloured flower, and a five-lobed leaf, resembling an ivy leaf, will always denote it to the collector. But all the species of *antirrhinum*, or snap-dragon, &c., with which we are acquainted, are remarkable, not only for the curious form of the corolla, but also for the general beauty of their appearance.

Many of our country friends are familiar with the eyebright, (*euphrasia officinalis*,) which was once esteemed of great efficacy in disorders of the eye; hence the poet Milton represents the angel as purging the visual organs of Adam with "euphrasy and rue," that is, with eyebright and the common garden rue. It has a small white flower, marked with purple lines, leaves small, pointed, and stiff, and grows on heaths and dry pastures. For further illustration, we may refer the reader to the veronica of our gardens, or to that little plant, which is often seen by grassy road-sides, and is remarkable for its blue flower, with two stamens and four divisions of the corolla. This is the wild germander (*veronica chamædrys*.) The lady's slipper, (*calceolaria rugosa*,) so conspicuous for its yellow flowers, which in shape resemble the fore part of a shoe, will furnish a pretty example for those to whom cultivated flowers are more accessible than the denizens of the country. Some species of this interesting flower are natives of the country about Conception in Chili, where they appear in company with other plants, (*bæa*,) belonging to this family. To form an imaginary picture of that country, one may paint with the pencil of fancy an expanse of verdure vieing in freshness with our choicest parks, sloping delightfully into every variety of hill and dale, and studded with clumps of myrtle trees, whose roots are garnished with the lady's slipper, and other kindred plants, not less curious in form, and more pleasing for the elegance and delicacy of their colours.

In the engraving, fig. *c* is the germen, or unripe fruit; fig. *d*, seeds, which are small and numerous.

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### PASCHALI, THE WALDENSIAN.

Mr. Blair relates the following particulars:—Negrino and Paschali exercised their ministry in Calabria, in comforting the persecuted people among the woods and mountains. But when the sufferers were so closely hunted, we could hardly expect the preachers to escape. At the instance of the inquisitor, they were both apprehended. Negrino was starved to death in prison at Casueza. At this place Paschali was detained in confinement eight months, whence he was sent prisoner to Naples, with the view of being conducted to Rome. The patience with which he endured the cross, appears from the sensible and ardent letters which he addressed to the persecuted church of Calabria, to his afflicted spouse Camilla, and to the church of Geneva. In one of these he thus describes his journey from Cosenza to Naples: "Two of our companions had been prevailed on to recant, but they were no better treated on that account, and we know not what they will suffer at Rome, whither they are to be conveyed, as well as Marquet and myself. The Spaniard, our conductor, wished us to give him money to be relieved from the chain by which we were bound to one another; yet, in addition to this, he put on me a pair of handcuffs, so strait that they entered into the flesh, and deprived me of all sleep; and I found that, if at all, he would not remove them until he had drawn from me all the money I had, amounting only to two ducats, which I needed for my support. At night the beasts were better treated than we, for their litter was spread for them, while we were obliged to lie on the hard ground, without any covering; and in this condition we remained for nine nights. On our arrival at Naples we were thrust into a cell, noisome in the highest degree, from the damp, and the putrid breath of the prisoners."

He was next sent in bonds to Rome, at which place his brother arrived from Coni, with letters of recommendation, to ask his liberty. With difficulty this brother obtained an interview with him, in the presence of a judge of the inquisition. He gives the following description of this first interview: "It was hideous to see him, with his bare head, and his hands and arms lacerated with the small cords with which he was bound, like one to be led to the gibbet. On advancing to embrace him, I sunk to the ground.

"'My brother!' said he, 'if you are a christian, why do you distress yourself thus? Do you know that a leaf cannot fall to the ground without the will of God? Comfort yourself in Christ Jesus, for the present troubles are not to be compared with the glory to come.'

"'No more talk!' exclaimed the judge.

"When we were about to part, my brother begged the judge to remove him to a less horrid prison.

"'There is no other prison for you than this.'

"'At least show me a little pity in my last days, and God will show it to you.'

"'There is no pity for such obstinate and hardened criminals as you.'

"A Piedmontese doctor, who was present, joined me in entreating the judge to grant this favour; but he remained inflexible.

"'He will do it for the love of God,' said my brother.

"'All the other prisons are full,' replied the judge.

"'They are not so full but that a small corner can be spared for me.'

"'You would infect all who are near you by your smooth speeches.'

"'I will speak to no one who does not speak to me.'

"'Be content, you cannot have another place.'

"'I must then have patience,' replied my brother."

In Paschali we see an instance of the power of the gospel supporting the soul in the most protracted sufferings. In a letter to his former hearers, like another Paul in his second epistle from Rome to Timothy, and like him, when about "to be offered," he thus expresses himself: "My state is this: I feel my joy increase every day as I approach nearer the hour in which I shall be offered as sweet-smelling sacrifice to the Lord Jesus Christ, my faithful Saviour; yea, so inexpressible is my joy, that I seem to myself to be free from captivity, and am prepared to die, not only once, but many thousand times, for Christ, if it were possible; nevertheless, I persevere in imploring the Divine assistance by prayer, for I am convinced that man is a miserable creature when left to himself, and not upheld and directed by God." Shortly before his death he thus addressed his brother:—

"I give thanks to my God, that, in the midst of my long-continued and severe affliction, there are some who wish me well; and I thank you, my dearest brother, for the friendly interest you have taken in my welfare. But as for me, God has bestowed on me that knowledge of our Lord Jesus Christ, which assures me I am not in an error, and I know that I must go by the narrow way of the cross, and seal my testimony with my blood. I do not dread death, and still less the loss of my earthly goods; for I am certain of eternal life, and a celestial inheritance, and my heart is united to my Lord and Saviour." When his brother urged him to yield in some degree, with a view of saving his life and property, he replied, "Oh! my brother, the danger in which you are involved gives me more distress than all that I suffer or have the prospect of suffering; for I perceive that your mind is so addicted to earthly things as to be indifferent to heaven."

At last, on the 8th of September, 1560, he was led to the conventual church of Minerva, to hear his process publicly read; and the next day, the 9th of September, he appeared, with the greatest fortitude, in the court adjoining the castle of St. Angelo, where he was burnt in the presence of the pope and a party of cardinals. Pius IV. wished to feast his eyes with the punishment of that man who had maintained the pope to be antichrist; but he and his cardinals could have wished either that they had been in another place, or that Paschali had been mute, or the people deaf; for the martyr expressed many sentiments from the word of God against the pope, which caused him considerable uneasiness. In the midst of the flames, he courageously censured his persecutors, summoning them to appear before the throne of the Lamb, to give an account of their cruelties and barbarities, and of their heresies, superstitions, and idolatries, with which they have defiled the church. The martyr caused these dignitaries to gnash their teeth with rage; he deeply affected all the other witnesses, and died fervently calling upon God.

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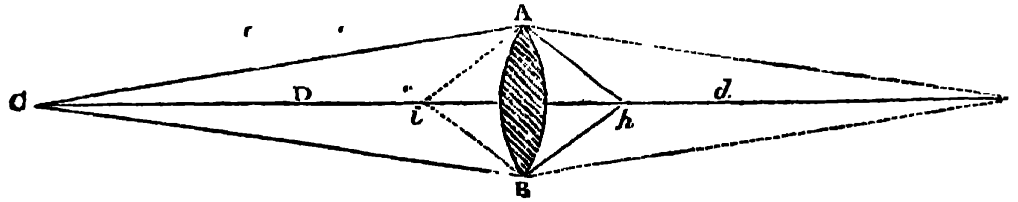
### THE TELESCOPE.—No. II

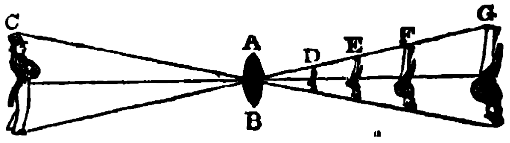
Having remarked that the image of an immensely distant object will be formed by a convex lens in its focus, it is necessary to show, that for objects situated near to us, the case will be different; for with such objects the place of the image will vary with its distance from the lens; and not only so, but what is of great importance, the magnitude of the image will also depend upon the same distance: we will endeavour to explain our meaning.

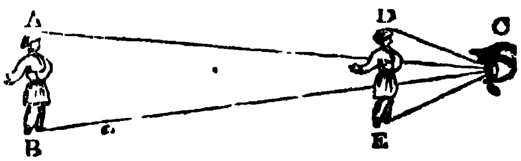
In the adjoining figure, suppose A B to represent a convex lens, and C an object at an infinite distance, as a star; thus all the rays of light which fall upon the lens from such object may be considered as parallel to each other, and will, after passing through the glass, meet in the focus *h* on the other side; let *i* be a point in front of the lens, at the same distance from it as the focus *h*, this point would be the focus, if the object C was transferred to the right hand, and placed at *c*. Now if the object C be brought near to the glass, as at D, then the image, instead of being formed at *h*, will recede from the lens, and be formed about *d*; if the object C be placed at *i*, then the image will be formed at an infinite distance, as shown by the dotted lines; or, in other words, the rays on leaving the glass will move on in parallel lines. In short, the distance of the object on one side of the lens, and that of the image on the other, reciprocally correspond; that is, if you put the object in the place of the image, the image will be formed in the place of the object.



The magnitude of the image thus formed must next be considered. When such a lens represents to us the image of the sun, of the moon, or of a star, at a few inches distant, it must be evident that these images must be incomparably smaller than the objects themselves. A star being much greater than the whole earth, how is it possible that an image of such magnitude should be represented to us at the distance of a few inches? But the star appearing to us only as a point, the image, represented by the lens, likewise resembles a point, and, consequently, is infinitely smaller than the object itself.

The nearer the image is to the lens, the smaller will it be; and the more remote it is, the greater will be its magnitude: thus let A B represent a lens, and let the man at c be the object; then if the image was formed at D, it would be smaller than if it was formed at E or F; and when the distance of the image is equal to that of the object, as at G, then both the object and its image are of the same magnitude; this takes place when the distance of the object C is double that of the focus of the lens. Thus, suppose the man to be placed at forty feet from the glass, and that the focus of the glass is twenty feet, then the image of the man will be formed forty feet behind the lens, and of the same size as the object itself. If this image is looked at from a few inches distant, it will be seen exceedingly distinct, and nearly as well as if the man had been suddenly transported from the distance of eighty feet to that of a few inches, and we should say that the man is apparently magnified; for instead of appearing under the small angle A B C,



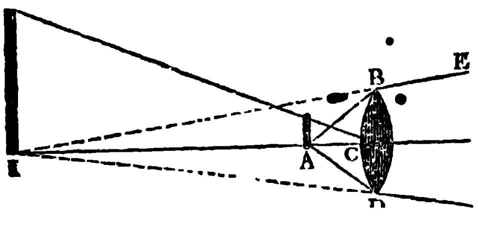


which he would do with the naked eye, his image would, by means of the lens, appear under the much larger angle D C E.

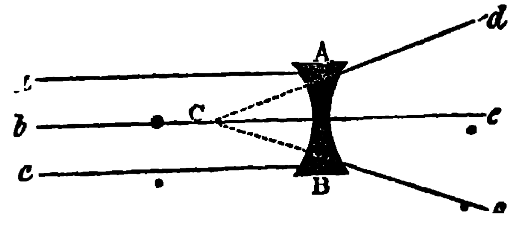
If the image of the man was formed twice farther from the lens than the object, it would appear double the size of the object; and in general as many times as the image is farther from the lens than the object, so many times will it be greater.

In all the above remarks we have supposed the object to be placed farther from the glass than the distance of its focus: we must now show what will be the effect if we place the object nearer to the lens than its focal distance.

In doing this we shall explain the principle upon which convex lenses, when mounted in frames called spectacles, become so serviceable to our more aged friends. It is well known, that as youth gives place to age, the eye which formerly was quick at discerning minute objects, and reading the smallest print, gradually fails; this arises from a change in the crystalline humour, of which the eye is in part composed. In youth the eye is very globular, being full of such humour; but as age advances, the eye flattens by its deficiency, when, of course, its refractive power is diminished: small objects, which are best seen at short distances, are no longer discernible; and to be seen at all they must be placed further off, (the eye having become longer-sighted,) where from their minuteness they will not be visible, and therefore the convex lens is applied in the form of spectacles to produce a distant magnified image of a near and small object. This is accomplished by placing the object to be viewed, or the paper to be read, at a shorter distance from the glass than its focal distance. Thus, let A be the object; and as its distance A C is less than the distance of the focus, the rays A B and A D, &c., which fall upon the lens from the object, diverge too much to be parallel to each other, by the refraction they undergo in passing through the glass; they will, therefore, be still divergent, as marked by the lines B E and D F, though much less so than before; if these lines be produced backward, they will meet at I. The rays B E and D F will, after having passed through the lens, preserve the same direction as if they had come from the point I, though they have not actually done so, it being only in the lens that they have taken this new direction. A person whose eye receives these rays, will imagine that the object of its vision is placed at I, where an imaginary image of the real object A will appear to be formed, and the spectator will receive the same impression as if the object itself was at I instead of A. The object at A will not only appear to be removed further off to I, but its apparent magnitude will also be greatly increased by as many times as the apparent image is further from the lens than the object is; as shown in our diagram, where the real object at A is apparently magnified to the size at I.



The reader may now easily comprehend the benefit derived from the use of spectacles containing convex lenses, to persons whose sight is not adapted to view near objects, but who can see them to more advantage at a distance, or what is commonly known by the term long-sighted. Such defect of sight usually occurs in aged people, some of whom require spectacles of a very near focus, and others more distant; but the foregoing remarks may give a general idea of the use of such spectacles. Of the assistance required by short-sighted persons, we shall speak hereafter, in describing the nature and properties of the concave lens.



Suppose A B to represent a concave lens, and suppose the parallel rays *a b c* to pass through the glass; in doing which, they will be so refracted, that on leaving it, they will diverge, taking a new direction, as if they had proceeded from the point C, the focus of the lens, which is the centre of the glass's concavity; thus the ray *a* will proceed on to *d*, taking the direction C *d*; the ray *b*, which passes through the centre of the lens, and coincides with its axis, suffers no refraction, but continues onward in the same straight line *b e*; and the ray *c* takes the direction c *f*. If these rays had passed through the glass in the opposite direction, namely, from *d e f*, and converging towards the point c, then the interposition of the lens would have caused them to move in the parallel lines *a b c*, after passing through it.

We are now prepared to explain how a concave glass is serviceable in assisting the vision of short-sighted persons. Suppose the rays of light *a b c* to proceed from some distant object, (which the eye of a short-sighted person placed at *e* is unable, without the aid of spectacles, to distinguish;) then in passing through the concave lens to the eye, they become so refracted as to appear to emanate from an image of the (distant) object formed at c; thus a short-sighted person is enabled, by the use of such glasses, to see distant objects as if they were close at hand. It is now easy to understand how those persons who cannot read without bringing the paper close to their nose, or walk the streets in safety, to observe the approach of carriages, may receive essential service from the use of concave spectacles, representing the most distant objects as very near; the image being formed within a few inches' distance. These images are much smaller than the objects themselves, as this shaped glass reduces instead of magnifies its apparent dimensions; but this by no means prevents distinct vision; and a small object near, may appear greater than a large object at a distance. Persons whose sight is short have occasion, then, for concave glasses, which represent objects as nearer; and those whose sight is long, need convex glasses, which represent to them objects as at a greater distance.

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## THE BOA.

The latins, as it is said, gave the term boa to serpents of extraordinary magnitude, because they fancied that they drained the udders of the cattle in their pastures; and although this supposition is erroneous, the name is still retained by modern naturalists, because it is convenient and long established. It was, however, first applied by Linnæus to the huge monsters peculiar to the hotter climates of the globe, which far surpass the longest snakes existing in the most southern parts of Europe.

The largest of these terrific reptiles, known in our quarter of the globe, are the quartre-raies, (*coluber claphis*,) and the serpent of Esculapius, (*coluber Esculapii*.) The first, which is supposed to be the boa of Pliny, is sometimes found to attain the length of eight or ten feet; the other, which the ancients represented in the statues of Esculapius, is not so long, but thicker than the preceding: they are both found in Italy, Hungary, Illyria, and other parts of Europe adjacent to the East. But what are these to the serpents which are produced in the inter-tropical latitudes? We speak not of those whose bite is fatal, whose teeth instil a deadly poison into the smallest puncture which they inflict, but of those whose gigantic powers render them formidable to the largest quadrupeds, and whose name is a bye-word of terror.

Fancy cannot paint a more formidable, a more terrific object, than a monstrous serpent: nothing can she conceive whose attack man or other animals can less successfully combat. Imagine yourself, for a moment, enveloped, as if by magic, in the folds of such a monster. His sinewy form, thirty feet in length, is twined around you; his weight bears you to the earth; the combined energy of thousands of muscles acting on so many levers, and every lever, every point on the strain upon you—crushes in your chest, stifles your feeble cries, breaks your vainly struggling limbs, and reduces you to a bruised and mangled corpse; and all this takes place so rapidly, so suddenly, that hope of succour is as vain as are your despairing struggles: should your companions hear your moans, your death is sealed ere they can bring assistance; if, indeed, panic has not deprived them of their reason. To avoid or to escape the attack of such a being, requires no ordinary presence of mind: nor, indeed, armed with any weapons, not excepting fire-arms, would it be safe to venture unsupported against an enemy of such tremendous powers.

These huge snakes act the tiger's part, they take their prey by stratagem; for what animal would go near them, were it aware of their presence? Hot steaming morasses, the swampy margins of rivers, the borders of lakes, the tangled underwood, that skirts the dark marshy forest; (places where a rank and luxuriant vegetation affords them adequate concealment,) are their favourite abodes. There they lurk, half floating on the water, half stretched upon the land, or partly twined around some rugged trunk, to the bark of which their colours assimilate. Patient to wait, undaunted to attack, rapid as an arrow or a flash of lightning to dart upon their victim, what can escape? They throw their bodies in folds and knots around that of their prey so instantaneously, that the eye cannot follow the action; and so great is their strength, that the solid bones of the ox snap beneath their efforts. Thus fares it with the deer, or the antelope, that comes to drink; crushed to an undistinguishable mass, it becomes the food of its hideous enemy, who, slowly untwining his tortuous length, proceeds to lick it with his quivering tongue, and besmear it with glutinous saliva, which distils abundantly from his ravenous jaws, capable of expanding to a most extraordinary degree: this done, he proceeds to suck in the yet warm flesh; and as he gorges the mass, sinks gradually into a state of lethargic stupor.

Many of our readers are acquainted with the fact, recorded in history, which relates to one of these huge serpents, against whose enormous force Regulus was obliged to employ the most effective military engines then known. This serpent occupied a certain situation on the banks of the river Begrada, between Utica and Carthage, and had destroyed many soldiers, who had gone to the spot for the purpose of procuring water. Darts hurled at him made no impression on his scales. The machines for throwing huge stones were obliged to be brought up, and at length a stone of prodigious size struck him on the back, and laid him prostrate on the earth. Regulus took the skin to Rome; and it is said to have measured one hundred and twenty feet; it remains, however, uncertain what this measure exactly meant.

Diodorus Siculus relates, that in Egypt, under one of the Ptolemies, an enormous serpent, thirty cubits long, was taken alive, though not without the greatest difficulty. The monster was in the habit of couching very much at his ease, on the margin of the water, where, folded in a circle, quite motionless, with the head just raised, (so that he could discern the approach of any animal which might come to quench its thirst,) he waited in expectation of his victim. Stimulated by the hope of gain, some hunters resolved to seize him alive, and carry him to Alexandria. Two perished in the first attack: still the courage of the men was unabated, and they planned to block up the entrance of the cave to which the animal was accustomed to retire, and to place near this haunt a net, composed of cordage, duly proportioned to the creature's strength. Into this snare he fell; frightened by the men who presented themselves suddenly in a body, advancing on him with their weapons, and making a noise with loud clashing instruments. After useless efforts to break his bonds, he was taken to Alexandria.

The accounts to which we have alluded, though, perhaps, exaggerated in their details, serve to show the acquaintance of the ancients with these giants of the snake tribe; and sufficiently demonstrate the terror which their powers had universally inspired. Nor are the accounts which modern travellers give, at all calculated to remove the impression.

Linnæus applied the term boa, as we have said, to those mighty, but not venomous snakes which are met with in the hotter climates of the globe. The term boa is now, however, restricted to a group peculiar to the inter-tropical regions of America: while to those of Africa, India, and the Indian islands, the term python is given; because they exhibit characteristics of their own, clearly separating between them and their American relatives, with whom they agree in size, habits, powers, and ferocity.

These preliminary observations we shall follow up in our next number, by a short account of the celebrated boa constrictor.

### BREAD.

The substances used for making bread, it need scarcely be stated, have been oats, barley, rye, and wheat; although, in early times, the latter was prized as a luxury, in comparison with its present consumption. The changes in the substances of bread it may be important to notice, inasmuch as they throw considerable light upon the comforts of every class of the people at the periods of such changes.

The earliest bread was a kind of porridge or pudding, of flour or meal mixed with water, and boiled; and when the method of kneading it into dough became common, the bread was nothing more than a kind of tough unleavened cake. The baking of these cakes, instead of being left to any particular set of men, as a distinct profession, was one of the principal concerns of the matrons; in those simple times, the most dignified ladies did not disdain to employ their fair hands in kneading the dough; and the modern title of lady originated in her being the *læf-dien*, or server of bread. In this first stage of the art of baking, the use of ovens was unknown; and the cake, when properly kneaded, was toasted either upon a warm hearth, or upon a gridiron. Such was the bread of the Anglo-Saxons; and a literal proof of their baking it before the fire is preserved in the accredited anecdote narrated in nearly every History of England, wherein Alfred is said to have let the neatherd's loaves burn on the hearth, or on a stone. Indeed, the bakestone is among the earliest domestic contrivances: it was first of stone, whence its name. It was next made of sow-metal; but, nevertheless, was still called a bakestone, though the use of stones for baking was still retained. In Wales, bread is or was lately baked upon an iron plate, called a girdle; wherefore it was named girdle-bread.

A few notices of the use of corn in England will show the reader how superior is the security from dearth in the present to former ages. A writer of the time of Edward III. states, that when the new corn began to be sold, no beggar would "eat bread that in it beanes were," but "of coket, or else clene wheate." The latter then lowered extraordinarily in price; as in 1317, after an abundant harvest, wheat fell from eighty shillings* to six shillings and eightpence per quarter. Immediately after the harvest, the people bought their store of corn at a cheap rate of the farmers; for there were no corn-dealers in those days; but the consumers becoming improvident, the supply fell short before the arrival of the following harvest, and prices advanced out of all proportion. Thus, in a document dated Colchester, 1296, we find almost every family provided with a small store of barley and oats, usually about a quarter or two of each; but wheat and rye are seldom mentioned. The corn was usually ground at home in a hand-mill or quern; although wind and water-mills were not uncommon. The quern was the ancient mill. In Wickliff's translation of the Bible, in Matt. xxiv. we read, "Two wymmen schulen (shall) by gryndynge in one querne;" and in the present version of the Bible the word "querne" is changed to "mill." Such a quern is common to this day in Eastern countries. Harrison, writing in the reign of Elizabeth, says that his wife ground her malt at home upon her quern, (or mill.)—*Domestic Life in England.*

### DIFFERENCE OF NATIONAL CUSTOMS.

WITH the Chinese, the left takes precedence of the right, as the place of honour; and white instead of black is the appropriate badge of mourning. From the peculiar construction of their compass, perhaps, which they call *che nan chay*, "a chariot pointing towards the south," they do not number the cardinal points in our order, but always mention the south before the north.

### HOLINESS.

BELIEVERS, as they were in the primitive times holy in their lives, so they professed this still to be the foundation of their holiness—Christ hath died, Christ is risen, Christ is in heaven; therefore we must live so and so: and this was their great profession. It dasheth all the carnal gospellers in the world. It would shame men out of their sins, or out of their profession of Christ. If Paul were alive, he would show the deepest abhorrence of him that will say he believeth in Christ, who died and rose again, and yet lived in sin, Rom. vi. 1, 2, 2 Cor. v. 14, 15.—*Goodwin.*

The especial procuring cause of holiness is the mediation of Christ. We are not in this matter concerned in any thing, let men call it what they please, virtue, holiness, or godliness, that hath not a special relation unto the Lord Christ and his mediation. Evangelical holiness is purchased for us by Him, according to the tenour of the everlasting covenant; is promised unto us on his account, actually impetrated* for us by his intercession, and communicated to us by his Spirit. And hereby we do not only cast off the moral virtues of the heathens from having the least concernment herein, but all the principles and duties of persons professing christianity, who are not actually and really implanted into Christ. For He it is who of God is made unto us sanctification, 1 Cor. i. 30, John xv. 5, Luke xxii. 32.—*Owen.*

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# THE
# WEEKLY VISITOR.

NUMBER CLXVIII.] TUESDAY, OCTOBER 20, 1835. {PRICE ONE HALFPENNY.

The Boa Constrictor beginning to uncoil itself, having destroyed its victim

### THE BOA CONSTRICTOR.

THIS gigantic snake, to which the epithets, king, emperor, divine, as indicating its fancied superiority over all other reptiles, have been given, is a native of the marshes, and luxuriant margins of the rivers and fresh-water lakes of inter-tropical America: there it reigns, a destroyer of life, the terror of man and beast. The swiftness of the deer is no protection, the monkey is not safe among the branches, nor the larger fish in the water. To climb, to swim, to dart along the ground, are among the endowments of this powerful reptile; and he avails himself of each of them in turn. It was from the display of such varied powers, combined with a nature daring, ferocious, and blood-thirsty, that the ancient Mexicans regarded the boa with religious veneration. The supreme divinity of that remarkable nation was represented with a snake in the right hand, or coiled around him and his altars.[*] To this image they offered bloody and inhuman sacrifices.

> "On a blue throne, with four huge silver snakes,
> As if the keepers of the sanctuary,
> Circled with stretching neck, and fangs display'd,
> Mexitli sate: another graven snake
> Belted with scales of gold his monster bulk."
>
> SOUTHEY.

"This great power, this indomitable force, its gigantic length, the lustre of its scales, the beauty of its colours, have inspired," says M. de Lacépède, speaking of the boa, "a sort of admiration, mingled with affright in most people, but little removed from a savage condition; and as all that produces terror and admiration, all that appears endowed with a great superiority over other beings, hardly fails to create, in minds little enlightened, the idea of a supernatural agent, it was not without religious fear, that the ancient inhabitants of Mexico regarded the 'divine serpent.' Whether they thought that an enormous mass, executing movements so rapid, could not be stirred but by a divine inspiration, or that they only regarded this serpent as a minister of the omnipotence of Heaven, it became the object of their worship. They gave it the title of emperor, in order to designate the pre-eminence of its endowments. The object of their adoration, it became that of their particular attention; none of its movements, thus to speak, escaped them; none of its actions could be to them a matter of indifference. As its protracted piercing hiss caught their ear, they listened with religious trembling; for they deemed that these sounds, these signs of the various passions or feelings of a being, which they regarded as marvellous and divine, must be connected with their destiny. It has happened, by chance, that these hissings have been much stronger, and more frequent, on the approach of violent tempests, pestilential diseases, cruel wars, or other public calamities. Indeed, it is frequently the case, that great physical calamities are often preceded by a violent heat, an extreme dryness, a particular state of the atmosphere, a high electrical condition of the air, by which the snakes would be excited, and led to utter hissings more strong than usual; and thus did the Mexicans regard those of the divine serpent, as forewarnings of the greatest evils; and heard them not without the utmost consternation."

A fearful picture of the blind and impious adoration paid to the ferocious boa, is finely drawn by Southey, in his poem of "Madoc:"—

"Forth from the dark recesses of the cave,
The serpent came!—the Hoamen at the sight
Shouted! and they who held the priest, appall'd,
Relax'd their hold. On came the mighty snake,
And twined in many a wreath round Neolin,
*Darting aright, aleft, his sinuous neck;*
With searching eye, and lifted jaw, and tongue
Quivering, and hiss, as of a heavy shower
Upon the summer woods. The Britons stood
Astounded at the powerful reptile's bulk,
And that strange sight. His girth was as of man,
But easily could he have overtopp'd
Goliath's helmed head, or that huge king
*Of Basan, hugest of the Anakim.*
*What, then, was human strength, if once involved*
Within those dreadful coils! The multitude
Fell prone, and worshipped."—SOUTHEY.

Snake worship was not, however, limited to the Mexicans; it appears to have been practised in various parts of the earth, from a very early period; and to have been attended with bloody sacrifices.

Like the rest of its race, the boa glutted with food, becomes torpid and inanimate, and is then easily killed. The native inhabitants account its flesh as excellent food; and use its tough, scaly skin as an ornamental vestment.

In cold and temperate climes the snakes become torped, and hybernate during the winter; but, in the torrid regions, there is no reason for supposing this law to be in operation. It would appear, however, that during the rainy seasons, the boa and other snakes are less alert and less mischievous than at other periods. When the rainy season is over, the boa casts its skin, (*epidermis*,) regains a new robe, is invested with the richest colours, appears endowed with renewed strength and vigour, and is all energy and courage: it is then doubly dangerous to venture near his retreat.

The eggs which the female deposits among the herbage are said to be remarkably small in proportion to the volume of the animal; their greatest diameter being not more than two or three inches.

The great vitality of the serpent tribe is not the least extraordinary part of their history; and the boa enjoys this organic property in a high degree. The head, separated from the body, will not only live for a considerable time, but snap, with innate ferocity, at any object presented, and violently retain hold of whatever it has seized: this we have ourselves witnessed in the case of the viper of our own country, the only poisonous reptile we possess. Happy for us is it, that the woods and meadows of our land neither teem with gigantic boas, nor with the smaller, yet more terrible race of snakes, whose bite is certain death. Three, or at most four, species of snake inhabit England. 1. The viper, (of which there are suspected by some to be two species, but this is very doubtful,) whose bite is fatal to small animals, and sometimes even to man; though the constitution of man and the dog usually struggle through: 2. the blind, or slow worm, a sluggish, harmless, little snake, very abundant in some places: and, 3. the common, or ringed snake; very active, an inveterate enemy to mice, young birds, &c. It sometimes attains to the length of four feet. It is quite harmless and may be tamed. A Mr. Cristman, of London, kept one eleven years, which exhibited the utmost attachment to its master. The preserved skin, with a testimony to the creature's merits, is preserved in the museum of the Zoological Society. M.

## BOTANY.—No. XXIII.

### SOLANACEÆ.

This is one of those interesting families which are brought within the range of our domestic acquaintance by the relation that some of their component members bear to the purposes of life in serving as articles of diet or medicine. That well-known and useful vegetable, the potato, is the root, (*tuber,*) or rather the subterranean stem of the *solanum tuberosum,* which may properly stand as the head and representative of all its brethren. The calyx is divided into five segments, and often permanent, that is, continues to accompany the fruit after the other parts of the flower have fallen off. The corolla is also cleft into five divisions, and bears as many stamens from its base. The fruit is divided into two cells by a partition which is bisected on each side by a ridge crowned with the seeds. This position of the seeds may be rendered easy to the apprehension by cutting one of the green capsicums or chilis across, and observing how the seeds descend in the middle line on each side of the partition. If the reader should happen to take a pleasure in investigations of this kind, he may remove the covering of the seed itself, when he will perceive, by the help of a little patience, that the embryo, something like a small pale worm, is curled round a white substance which is called the albumen. The characters we have now given are the leading ones, as far as the fructification in its parts are concerned; but the appearance of this family was long ago considered as peculiarly indicative of the dangerous qualities which many of them possess: as if the providential care of God had given us a cautionary notice and warning in the gloomy aspect and unlovely hues and scents of certain plants, that we may not proceed at once to taste the fruit, which is often attractive, or apply their foliage to purposes of diet, till trial and experiment can vouch for the safety of their use. To remind the reader of their poisonous character, we need mention only the *atropa belladonna,* or deadly nightshade, and the *hyosicamus niger,* or henbane. It will, therefore, at first sight appear a little singular that the potato should belong to a family impressed with qualities so much to be dreaded; but to explain the discrepancy by reference to analogy, we have only to recollect what a curious change the process of earthing up effects in a stem, as in the celery and sea-kale, for example. Take a stem of the former, when ripe, and bite off a piece that has grown two inches below the earth's surface, and then a piece that has grown two inches above the earth's surface, and then mark what a difference in flavour and quality. The potato is a free stem propagated by the parent, and is ripened for use by lying in the soil precisely as in the two instances just cited. When a potato is exposed it turns green, as a stem in natural course does, and, as an eatable, becomes unwholesome and disagreeable. After having stated thus much in reference to the potato, which, as we may hint by the way, came originally from Mexico, we may go on to mention a few examples for further illustration and exercise. The *datura stramonium,* or thorn-apple, which is a native of this country, but frequently finds a place in our gardens. The thorny points upon the seed-vessel render it a plant of easy recognition, though these are not essential to the genus datura, but the four-valved capsule and funnel-shaped plaited corolla. The gloomy appearance and disagreeable smell may easily suggest a recollection of the general character of the solanaceæ. The bitter-sweet and the black nightshade are easily known by the exact resemblance which their flowers have to those of the potato. The former (*solanum dulcamara*) produces berries of a bright red in our hedges, while the latter (*solanum nigrum*) yields black ones upon compost and among rubbish.

The tea plant, (*lycium barbatum,*) which forms such a fast-growing covering for bowers and walls, belongs to this family. It is a native of France and Japan, where it is used sometimes as a substitute for tea; whence its name. Hence we may infer that though its blossom has a melancholy hue, it possesses but little of those narcotic properties which are found in many others of the same order. We may also refer to other examples in the mulleins, which it would seem are neither hurtful nor unsightly. This genus (*verbascum*) distinguished by its wheel-shaped corolla and its bearded filaments, comprehends several species which are occasionally seen in gardens, and are remarkable for a long spike of yellow flowers, and the downy covering of their leaves. The great broad-leaved mullein (*verbascum thapsus*) is often a solitary but a conspicuous object by road sides. Its tall, straight stem, bright yellow flowers, and pale downy leaves will always point it out as the plant in question.

The winter cherry, (*physalis alkekengi*,) so remarkable for the enlargement of the calyx, claims a space here; the blossom very much resembles that of the potato, while the pulpy seed-vessels, when ripe, make an agreeable dessert, especially in hot climates. This example shows that the gloomy appearance, joined to the botanical characteristics, may be esteemed a salutary caution, and is not an invariable prohibition against eating the fruit of these plants.

The last we shall name is the *nicotiana tabacum*, or tobacco plant. The narcotic properties of this pernicious weed are soon felt on the first trial of the inexperienced, while they are subsequently attested by the haggard looks and declining appetite of those who yield themselves to its indulgence.

### THE TELESCOPE.—No. III

A TELESCOPE magnifies as many times as it represents objects under an angle greater than is presented to the naked eye.—(See the cut representing the different angles under which the man is viewed, in the 2nd column of page 372 ) The moon, for example, appears to the naked eye under an angle of half a degree; consequently, a telescope magnifies one hundred times, when it represents the moon under an angle of fifty degrees, which is one hundred times greater than half a degree. If it magnified two hundred times, it would represent the moon under an angle of one hundred degrees: and the moon would, in that case, appear larger than one-half of the visible heavens, whose whole extent is only one hundred and eighty degrees. It therefore happens, that, in viewing the moon through a telescope of a high magnifying power, a small portion only of her disk is visible at a time; because the size of the telescope remains the same, whilst the apparent size of the moon is increased · consequently, the telescope must be moved about, to view different parts in succession, in order to examine the whole. Thus a telescope whose object lens (that is, the glass next the object, or at the further end of the telescope) is three inches diameter, when it is adapted to magnify about forty times, it will show the whole surface of the moon at once, as shown in figure No. 1; if a power of one hundred be applied to the same telescope, it will show a much less portion of the moon at a time, but greatly magnified, as represented in figure, No. 2.

Fig. 1.

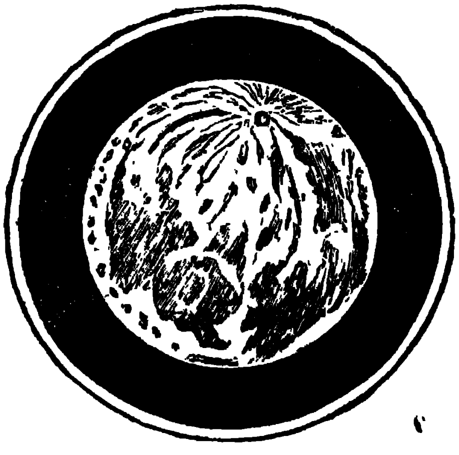
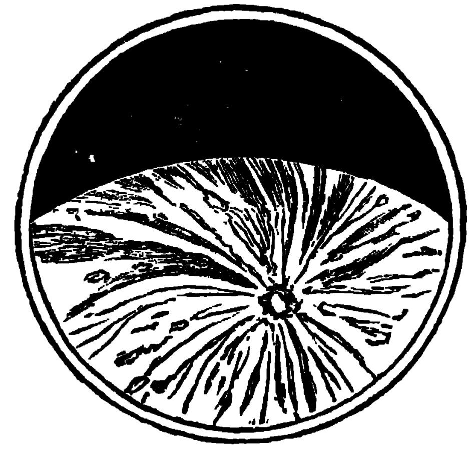
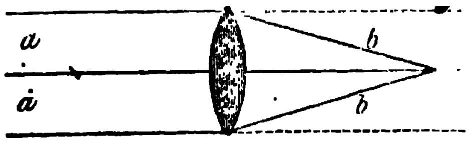


Fig. 2.



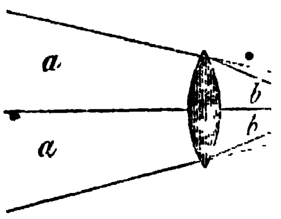
The principal end of telescopes, then, is to increase, or multiply, the angle under which objects appear to the naked eye. Accordingly, we say, that such a telescope magnifies twenty, sixty, or a hundred times, &c.

Before showing the arrangement of the glasses to form a telescope, we must remind the reader of the following general particulars, which we have before explained; namely, by a convex lens parallel rays are rendered convergent, and convergent rays parallel; thus,



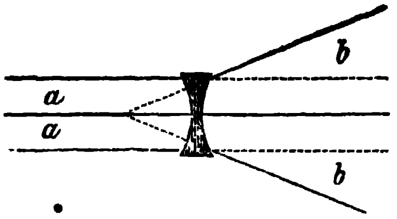
(*a*, *a*, parallel rays ; *b*, *b*, convergent rays.)

and convergent rays become still more so, and the reverse as before; thus,

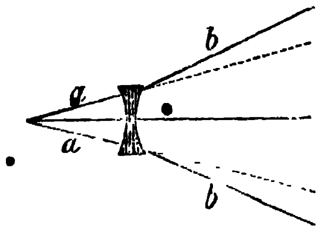


(*a*, *a*, convergent rays ; *b*, *b*, more convergent.)

By a convex lens, parallel rays are rendered divergent, or if you consider those rays marked divergent, as converging to a point, then it is clear that a concave glass renders converging rays parallel, and divergent rays become still more divergent, and the reverse; thus,

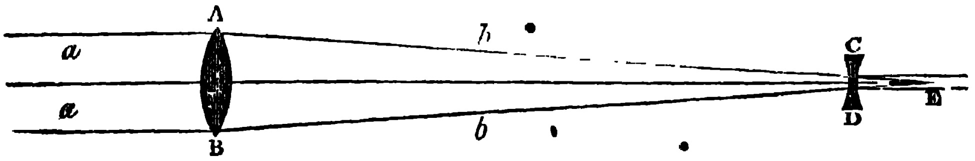


(*a*, *a*, parallel rays ; *b*, *b*, divergent rays.)



(*a*, *a*, divergent rays , *b*, *b*, still more divergent.)

The following figure represents the arrangements of the glasses, forming a telescope of the simplest kind:—



(*a*, *a*, parallel rays. *b*, *b*, convergent. *c*, *d*, parallel.)

A B is a convex lens, called the object-glass of the telescope, whose focus is at the point F, which (as explained at page 372) is the point where the image of an infinitely distant object would be formed by the parallel rays which fall upon the glass being refracted in passing through it, so as to converge to this point. C D is a concave lens, called the eye-glass, which is placed nearer to the object-glass than the point E, by the distance of its own focus, so that the point E is the focus of both glasses. Now, the parallel rays, after passing through the object-glass, converge towards the focus E; but it is evident, that before they arrive at that point, they must pass through the eye-glass C D, which, being concave, cause all converging rays to become parallel, as before stated; therefore, the rays on leaving the eye-glass, again become parallel to each other, as they were when they first reached the object-glass. By thus rendering the rays parallel, to enter the eye of a person placed at E, more distinct vision will be obtained, as objects are, in all cases, best distinguished when they are so distant that the rays of light from them which fall on the eye are parallel to each other.

The magnifying power of such a telescope as above described, amounts to as many times as the focal distance of the object-glass A B is greater in length than that of the eye-glass C D. Thus, supposing the distance of the object-glass A B, from its focus F, to be thirty-six inches, and that the distance of the eye-glass C D from its focus (which is the same point E) is one inch; then the difference between these two focal distances is thirty-five inches, and therefore such a telescope would magnify thirty-five times, or the object viewed would appear under an angle thirty-five times greater than when viewed by the naked eye. It hardly need be remarked. that the glasses are fixed in a tube, though not so represented in our figure.

When a telescope is directed towards the heavens, or to very distant objects on the earth, the space discovered appears in the figure of a circle, that being the aperture of the tube which forms the telescope; and we see those objects only which are included in that space; so that to examine other objects, the position of the instrument must be altered: this circular space presented to the eye of the spectator is called the field of the telescope. It will readily be understood, that it is a great advantage to have a very large field of view; for suppose two telescopes directed to the moon, by the one of which we can discover only a portion of that luminary, whereas by the other we see her whole body, together with the neighbouring stars, (see our cut, Fig. 1, and Fig. 2,) the field of the first is, therefore, much greater than that of the other: and relieves the observer not only from the trouble of frequently changing the position of the instrument, but procures another very great advantage, that of enabling us to compare several parts of the object, one with another, by viewing them at the same time. The extent of the apparent field of a telescope will, however, depend upon the magnifying power employed. A much lower power, as before explained, will enable us to discover the whole illuminated surface of the moon at once; but an increase of power produces a correspondent diminution of the apparent field, because, while we increase the apparent size of the object, the diameter of the telescope remains the same. It is consequently desirable, that a telescope should have as large an aperture as possible, by which means a higher magnifying power may be advantageously employed.

## MARRIED COUPLE.

I HAVE a message for you, a high and a holy message, coming from a high and a holy source; one that concerns your comfort, your enjoyment, and your peace. An attention to it will shield you from many sorrows; a neglect of it will burden you with many calamities. Now mind that you receive it in a friendly, kind-hearted way.

The Psalmist cried out, " Behold, how good and how pleasant it is for brethren to dwell together in unity!" And if it be goodly and pleasant for brethren to do this, surely it must be still more so for husbands and wives. Receive, then, the message with affection, " Bear ye one another's burdens."

Did you ever find your hearts fill with joy when you beheld a married couple surrounded with comforts, animated with the same hope, journeying on together towards the same heaven, affectionately loving and highly honouring each other; and, in addition to all this, bearing each other's burdens? Oh it is a lovely, a glorious thing in this world of affliction, to find hearts knit together in sorrow and in joy, sharing with equal willingness the shine and the shade!

And have you never looked with pain upon an ill-matched pair, reminding you of dogs chained together, pulling different ways? Have you seen the eye inflamed with wrath, whilst the tongue was venomed with bitterness, and discomfort, clamour, and confusion reigned around?

Oh it is a bitter and an evil thing for those who are in wedded life to dwell in hatred, not in love; increasing, instead of bearing each other's burdens.

I know not how it may have been with you, but the experience of Old Humphrey has taught him, that troubles will come without being sought after, and that there are thorns and briers enough in the world, without our gathering them and planting them in each other's bosoms.

You have just entered on a new life, and God of his mercy grant that it may be a happy one; but as it was of olden time, so it is now, weeds spring up in the fairest gardens. Such is the evil of our nature that the cockle will grow with the wheat, and the thistle with the barley; and so long as the human heart is not wholly sanctified with God's grace, so long will its infirmities ever and anon get the upper hand, setting at variance those whose heart-strings should be twined together; bear, then, with a few remarks from Old Humphrey.

Perhaps you have known each other from the days of youth, and succeeding years may have strengthened your affection. You were, perhaps, so well acquainted with each other's dispositions and qualities, that marriage has not made manifest a single infirmity that you did not know before. If so, happy are ye.

But if, on the contrary, when you entered into wedded life, you were but half acquainted with each other; if circumstances were not favourable to that thorough knowledge which beings eating of the same bread, and drinking of the same cup, and sharing the sweets and bitters that fall to the lot of humanity, ought to possess, why, then, make amends for this disadvantage as far as you can, by bearing each other's burdens.

It is an easy thing to love what is lovely in each other, to smile when the sun shines, and to be kind and good-tempered when your partner is kind and good-tempered too; but this is no proof of real affection.

Can you put up with each other's infirmities, bear with each other's waywardness, and forgive each other's errors? This is proving your affection; this is, indeed, bearing one another's burdens. Old Humphrey is in the habit of putting some searching questions; questions that at times go right to his own heart, while he means them to go to the hearts of others; he feels his infirmities, and smarts under his own correction; so much, as to be half disposed to blot out the observations he has made; but he will be faithful in spite of his infirmities; he will speak plain truths, ask plain questions, and make plain remarks, whoever may be affected by them.

It is a clear case, that "two cannot walk together unless they are agreed;" but if they are agreed, they get on wonderfully well. The one may be stronger or weaker, bolder or more timid than the other, but that will not signify. The one may be a good walker, and the other a very bad one; there may be some lameness or weakness in the one, and not in the other; but still they will so accommodate themselves to each other's infirmities, that they will go forward in comfort and peace; and if this be true of any people in the world, it is particularly so of married people.

The path may be stony, the hill may be steep, the hedge thick and thorny, the stream strong and deep; but all will be overcome by helping each other along, by encouraging each other, and by bearing each other's burdens.

I trust that you have not built your hope of earthly happiness on the mere attractions of each other's persons. A handsome face and an agreeable way of behaviour are but a poor stock of comforts to begin housekeeping with. You have something better than these, but have a care how you begin; for a good beginning is the best preparation for a good ending. You are now at ease; but as the fairest summer has its thunder-cloud, so surely will the smoothest life have its cares. Are you ready to meet with disappointment and anxiety? Are you ready to bear each other's burdens?

Your wants appear to be well supplied. In Scripture language your heads appear anointed with oil, and your cup runs over; but it may not always be so, for gold and silver make to themselves wings and fly away. What if want should take the place of plenty? Will you then look kindly on each other? Will you then bear each other's burdens?

You are in health, but you cannot reasonably expect to remain so long; the tooth-ache, the head-ache, the heart-ache, and a hundred other ails are known by others, and are likely enough to be felt by you, and they may try you sorely; and if care, want, and sickness, should meet together in your habitation, you will have need of all your affection, ay, and of God's grace, to enable you to remain kindly affectionate one to another, and to bear one another's burdens.

If you cannot travel together with affection, you will find hatred and unkindness but sorry companions. If helping each other will not do, hindering one another will do worse. If bearing one another's burdens will not enable you to trudge along tolerably comfortable, you will make but a sad business of it, by adding to each other's load. Therefore "Bear ye one another's burdens."

If you have made your calculation for fine weather only, go and bespeak an umbrella, for be sure you will have need of it. If you think to look at each other always with the same fond and affectionate regard that you have yet done, Old Humphrey tells you, in spite of your fairy dreams of unabated love, that if you go through the first year of your married life without a single heart-burning, you will deserve to have your pictures framed and glazed, and hung up in the market-hall for universal admiration. No! no! Old Humphrey will tell you the truth; however you try to flatter and deceive one another, you are a pair of poor, weak, erring, sinful creatures, requiring Divine aid every moment of your lives, to keep you from inattention, from wanderings of heart, from selfishness, from bitterness, and from hatred.

If you really wish to love one another always, you must love God always; for none but God can preserve your affection, and enable you to bear each other's burdens.

And, mark me, when the time comes, as come it will, when you feel yourselves to be overtaken in a fault, when you have been angry one with another, be faithful in questioning your own hearts. Say to yourselves in private, "Am I sure the fault is not mine? Have I not been thoughtless, unreasonable, selfish, hasty, or bitter? If in the wrong, have I made acknowledgment of it, and am I anxious to avoid my error in future? And if in the right, am I desirous to manifest more forbearance to my erring partner?" These are questions that most of us are shy in putting to ourselves, but they are precious medicine, and if taken with a dependence on God's blessing, will do us great good. It will render us more humble, cautious, and forbearing; it will increase our affection, and it will do much towards influencing us to bear each other's burdens. Why cannot we always dwell in affection, and bear each other's burdens? Why should an aggravating or an angry feeling ever rise in our bosoms? It is because we have an enemy in the camp; a deceitful heart in our bosoms, influencing us to believe that we are always right, and that others are always wrong; teaching us to call things by wrong names, and persuading us that aggravation is merely thoughtlessness; selfishness, nothing more than prudence; and bitterness of heart, a virtuous indignation.

In short, Old Humphrey's opinion is this, that we are all so bad that God alone can mend us; and that the only way to dwell in continual affection, bearing each other's burdens, is to live continually dependent on God, seeking the influence of the Holy Spirit continually, taking the blessed gospel of his beloved Son our Saviour for our guide, and seeking fervently at the throne of mercy for those heavenly supplies that our earthly infirmities require.

Old Humphrey, had his object been to please you, might have spoken more pleasantly, but he wishes to do you good, even though it be against your will. Let not your affections, then, be a flower that opens and shuts in a day, but a tree whose deep-struck roots will bear the rocking of the wintry storm. You do not half love one another, if you wish not to love each other through eternity; and if you wish to love each other through eternity, you will desire through time to dwell in affection, and to bear each other's burdens.

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### ALMANACKS.

Almanacks in England are of considerable antiquity. Our Saxon ancestors were accustomed to cut or carve upon square pieces of wood the courses of the moon for a whole year, by which they could tell when the new moons, full moons, and changes would occur; and these pieces of wood were called by them Almonaught, (al-moon-hee,d) whence the word almanack. Subsequently, these pieces were called clogs, and till within these few years they were common in Staffordshire. Some were of large size, and commonly hung at one end of the mantel-piece; others were smaller, and carried in the pocket. The days were denoted by notches, and the other records by figures, which are too numerous to describe. One of these Saxon almanacks may be seen in St. John's College, Cambridge.

Almanacks, like books, were also written on parchment, brilliantly ornamented, or illuminated with colours: a very splendid collection of these, of the fourteenth century, exists in the British Museum.

After the invention of printing, almanacks became generally used in Europe. The earliest English almanacks were printed in Holland, on small sheets: and these have occasionally been preserved, from having been pasted within the covers of old books.

The almanacks most similar to the English are produced in Persia. In one of these, the first page contains a list of fortunate days, to buy, to sell, to take medicine, to marry, to go a journey, &c.: their predictions of earthquakes, storms, political changes, &c., being after the manner of the well-known More's Almanack.—*Domestic Life in England.*

◆

### GOD'S GREAT DESIGN.

God's great design, in the method of salvation, made choice of by infinite wisdom, was to stain the pride of all glory, that "no flesh might glory in his sight," but that "he that glorieth should glory only in the Lord," Jer. ix. 24, 1 Cor. i. 31.—*Halyburton*

◆

### THE SAVIOUR.

From the intimate conjunction that is between Christ and the church, it is just and equal in the sight of God, according to the rules of his eternal righteousness, that what he did and suffered in the discharge of his office should be esteemed, reckoned, and imputed unto us, as unto all the fruits and benefits of it, as if we had done and suffered the same things ourselves, Isa. liii. 5, 6.—*Owen.*

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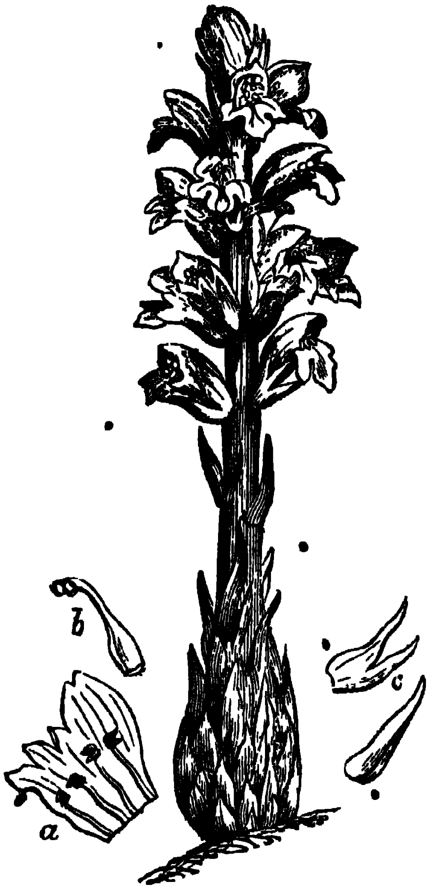


OROBANCHE MAJOR, BROOM RAPE.

Fig. *a*, corolla, exhibiting the stamens, of which two are longer than the other.
Fig. *b*, germen, or future seed-vessel, terminated by the style and stigma.
Fig. *c*, the calyx divided into two halves

## BOTANY --No. XXIV.

### PEDICULARES.

IN treating of this family, we cannot, as in many other instances, take our departure from some well-known plant, and bespeak the attention of the reader for the rest, by pointing out their relationship to their principal. But several of the plants belonging to it are, from their abundance in certain situations, very apt to engage the eye of the inquisitive, and excite some question about their nature and conformation. In moist places, where the water is stagnant for a good part of the year, especially in the neighbourhood of heaths and common pastures, we find the lousewort (*pedicularis sylvatica*) in great plenty. It may be known by its pink red flowers, and its leaves, which are prettily divided into roundish segments. A closer observation will show that the lobes of the calyx are notched in imitation of the leaves. This plant is very common in many places upon Hampstead-heath, where the frequency of its appearance, and the neatness of its outline, have induced persons but little interested in the pursuits of botany to ask by what name it was called.

When we enter the glades of some shelving wood, a widely-branching plant, of a dismal green, with here and there a few yellow flowers, meets our eye. This is commonly the meadow cow-wheat (*melampyrum pratense.*)

In the early part of summer, the grass in some meadows is diversified by the flowers of the yellow rattle, which has a peculiar feature in the swollen or puffed nature of the calyx. In fact, the enlarged calyx forms the leading generic character in the rhinanthus, to which the yellow rattle belongs, called *rhinanthus crista-galli.*

Should our walk be directed over the springing soil of a marsh, or along the banks of a river, we shall, in the first instance, meet, under favourable circumstances, a specimen of the genus bartsia, which is distinguished as a genus by the dyed leaves of its calyx, which sometimes surpasses in freshness of colour the corolla, contrary to what usually happens in other plants, where the calyx contributes but little to beautify the flower; it is therefore generally neglected or overlooked by those who are chiefly pleased by its external comeliness. The red eyebright (*bartsia odontites*) is very common in some places. It is a plant about a foot high, with many erect branches, and numerous small narrow leaves of a dull green colour. The flowers grow in clusters at the top of each branch, and are all turned one way. The corolla is of a rosy red, while the calyx is violet-coloured. This plant, so common under every hedge-row, and in almost every pasture in many parts of Suffolk, was among the first that puzzled the attention of the writer of this article. It was by no means satisfactory to tread upon a plant in every corner of a field, or in any grassy strip of roadside, without being able to say with certainty by what name it was known among botanists. It was not unpleasing to find, at a subsequent period, that the plant had perplexed the minds of more experienced students of nature, some regarding it as a species of euphrasia, and others as belonging to bartsia.

This general allusion to the red eyebright will point it out to most readers with greater facility than a more laboured description. Should any of our friends be in possession of a few dried specimens of the genera here enumerated, or, what is better, have the means of procuring the recent plants, the laying them side by side, for the purpose of mutual comparison, will afford an interesting and an instructive lesson. See the irregular shape of the corolla, which is generally so divided as to have the resemblance of an upper and nether lip, of which the former is variously shaped, and thus imparts a peculiar character to the blossom, while the latter is for the most part divided into five lobes. The stamens are, as in the labiacea, or plants resembling dead-nettle, disposed in pairs which differ in length. But the chief point of uniformity, and to which a final reference is made, is found in the structure of the seed-vessel, which is divided into two cells by a partition which rises from the centre; or, to speak with more propriety, from the middle line of the valves. Upon each side of this partition the seeds are borne. No difficulty will attend the examination of the seed-vessel, or in ascertaining the mark we have pointed out; for the seed-vessel of the cow-wheat, which may be found in every wood, or of any of the rest aforementioned, will teach the unassisted eye, that it is composed of two flattened pieces or valves, joined together by a seam at their edges. If a horizontal cut be then made across, a partition, studded with seeds, connecting the valves by their middle line, will be exposed. There is nothing abstruse in the detection of this directing character in the *pediculares,* which, the reader may be assured, is as obvious to the eye of inquiry, as it is important in distinguishing this family.

For the sake of illustration, we have given a figure of the *orobanche major,* or broom-rape, at the head of this article, as it affords a specimen, both of a family and of a genus, which is singular in growing in a parasitic manner upon the roots of other plants. This finds its abode upon the roots of the common furze, while another species selects a correspondent situation upon the clover. The mistletoe has become so familiar to our acquaintance, that we cease to feel any surprise when we see tufts of it about the branches of the oak; but when we observe that such humble productions as the furze, the broom, and the clover, are called upon to support a little intruder out of their own proper store of nutriment, our surprise is awakened, and we feel an unusual anxiety to remember the circumstance.

◆

## ORIGIN OF THE BIBLE SOCIETY.

From Leifchild's "Life of Hughes."

The committee meetings of the Religious Tract Society took place, for the first fourteen years, on the premises of the late Joseph Hardcastle, Esq., near London-bridge. Mr. Hardcastle was at that period the treasurer of the London Missionary Society; a man of a princely spirit, and devoted to the promotion of religious knowledge. His rooms were gratuitously afforded to the committees of both these societies, with their morning refreshment, and every necessary accommodation. He had the gratification and honour, while he lived, of hearing his counting-house and offices adverted to as the birth-place or nursery of some of the noblest institutions that Britain or the world contains. This, too, is a heir-loom in his family, which cannot but be highly appreciated. It will descend with the name of Hardcastle to future generations. "I scarcely ever pass over London-bridge," said the Rev. John Townsend, "without glancing my eyes towards those highly-favoured rooms appertaining to our beloved friend's counting-house, at Old Swan Stairs, and feeling a glow of pleasure at the recollection, that there the *London Missionary Society, the Tract Society, the Hibernian Society*, &c., formed those plans of christian benevolence, on which Divine Providence has so signally smiled."

There it was that the Rev. Joseph Hughes, the secretary of the Tract Society, and his colleagues, met together, from time to time, to transact the business of that institution; delighted as they must often have been at the increasing patronage it obtained, and, as the consequence, at its enlarged capabilities and prospects of usefulness. There, too, it was (at Old Swan Stairs) that the British and Foreign Bible Society took its rise.

Previously to its formation, he could not but be aware of the lamentable fact of the great scarcity of the Scriptures in these realms, notwithstanding the efforts of several societies already in existence for their dissemination. He had conversed with individuals on the subject from the Principality; he had preached the sermon before the Scottish Society for Promoting Religious Knowledge in the Highlands and Islands, whose published reports told of the deplorable condition, in this respect, of the mountaineers of that country; and he was in the habit of hearing details from the associations belonging to the society, with which he was already connected, of the most affecting instances of such destitution. It was next to impossible that his benevolent mind should not be led to muse on these painful discoveries, and on the desirableness of some plan to remedy the evil. Such a sentiment, in point of fact, appears from his writings, to have been long operating in his thoughts, and waiting only for a proper occasion to burst forth into action. It was a spring under ground, accumulating its waters, and continually rising near the surface. That which revived and enlarged its operations, was the information brought to him, from time to time, of the still more deplorable condition, in this respect, of the inhabitants of the continent, as well in protestant countries as in those avowedly catholic. He saw the whole of Europe, to say nothing of remoter lands, enveloped in shades of ignorance, which the sun of revelation had but faintly and partially pierced; in no place so completely as wholly to disperse them; in some not so much as in any perceptible degree to abate the gloom.

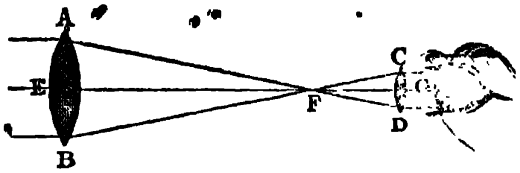
Things were in this state, when an incident occurred, which can scarcely be looked upon in any other light, than as a direct interposition of Providence. The Rev. T. Charles, a clergyman of the church of England, but frequently officiating among the calvinistic methodists in Wales, paid a visit to the metropolis. He represented, with all the characteristic ardour and pathos of his native country, the dearth of Bibles in the native language of the Principality. He told of a scanty supply which had once been obtained from the Society for Promoting Christian Knowledge; but which, by its inadequacy, had served rather to increase than allay the anxiety of the inhabitants; as the thirsty earth but pines and languishes the more for a few big drops only from the cloud, which had been expected to shower down an abundance of moisture. This individual being present as a visitor at the committee-meeting of the Tract Society, spoke upon the subject of a supply of Welsh Bibles, (Mr. Joseph Tarn, a member of the committee, having previously introduced him,) and urged it most earnestly upon the attention of the meeting. To supply Bibles was not the professed object of the society; yet he could hardly have been introduced to a circle [illegible] individuals in the whole world, more disposed to listen to his representations, to sympathize with his feelings, and to respond to his calls. The whole meeting instantly felt the desirableness of the object; but the mind of the secretary was warmed with the subject, his previous train of reflections was recalled and quickened into motion, and wrought, it may well be believed, into a high degree of energy. His views, probably, in connexion with those of the members present, went much further than the specific object proposed to them—the supply of the Welsh. The precise language in which he expressed his views, is now difficult, if not impossible to ascertain; and we must, therefore, be contented with the fact. Some, indeed, of the individuals present at that meeting who survive, recollect nothing particular: others retain a sense of his distinct and emphatic utterance of this remark: "Why not Bibles for the whole country—for the whole world?" The minutes of that meeting, which were revised by himself and Mr. Tarn, under a concern to leave a perfectly accurate account of what had transpired, record that such an object, "AT THE SUGGESTION OF THE SECRETARY," was deemed worthy of attention, was suitable for the notice of that body, and should be placed on record for their consideration at their next meeting. This fact he himself, though careful of not having too much attributed to him, always admitted. It appeared in several printed accounts while most of the members of that committee were living, and all had access to the minutes as well as himself. A variety of particulars in his correspondence, as well before as after this period, *and the part immediately* and thenceforward assigned to him in all ulterior proceedings, confirm the idea. It may, therefore, be safely concluded, that the elements of the new institution were first of all deliberately conceived in his mind; that there its original seed was planted by the hand of its Almighty Author. The facts above related occurred in the memorable morning of December the 7th, 1802. The views and feelings of *all* present accorded with the suggestion or suggestions, made to that effect, above noticed.

Mr. Hughes was requested by the chairman, in the name of the rest, to embody the sentiments then delivered, in a written address, to be read to them at a future meeting convened for the purpose. He readily complied, and after several meetings of the same kind, the address, with some few emendations, was ordered to be printed, with a view to its immediate circulation.

The publication of Mr. Hughes's Essay took place early in 1803, and for something more than a year the project was repeatedly contemplated with serious and, it may be believed, with much prayerful thought, by the pious and benevolent men of various christian denominations, who then formed the committee of the Tract Society, with the assistance of a few others of a kindred spirit. At length its first general public meeting was called on March 7th, 1804, Granville Sharp, Esq., in the chair.

## TELESCOPE.—No. IV.

We last gave an account of what is called the Galilean telescope, which possesses a concave eye-glass; we now proceed to explain what is more commonly termed an astronomical telescope, which, like the former, consists of only two glasses the eye-glass being convex instead of concave.



The object-glass A B is the same as in the Galilean telescope, convex, whose focus is in F, where the image of a celestial object would be formed; then on the axis of the object-glass E G, we fit a small eye-glass C D, of much greater convexity than the object-glass A B, and so placed that its focus shall also be in the point F; then (as explained at page 381) the rays from the image at F, which strike upon the eye-glass, will become parallel, on leaving it and entering the eye; distinct vision will thus be obtained; and the magnifying power will be, as in the former case, as many times as the focal distance of the object-glass exceeds that of the eye-glass.

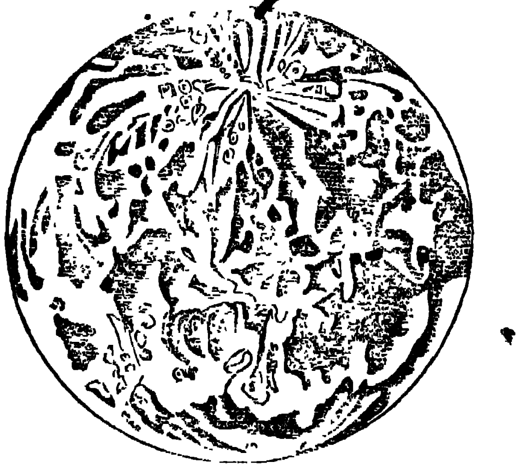
When the telescope first came into use, and for a long time after, it was usual to make them of a very great length, to obtain a high magnifying power, as the focal distance of the object-glass could thus be made very much greater than that of the eye-glass; but the modern great improvements in optical science have quite supplanted those ponderous and cumbersome instruments, by placing at our command more portable and efficient ones, (the principle of the instrument remaining the same.) We are now enabled, with a telescope of five or six feet length, to do more service to the science of astronomy, than our ancestors could do with their unmanageable telescopes of one hundred feet. Hugens constructed an instrument, which he called an aeriel telescope, of one hundred and twenty-three feet focal length, in which he dispensed with the tube altogether, thinking that, by such an arrangement, it would be more manageable; this telescope was presented by him to the Royal Society, and was used by Dr. Pound, and his nephew, Dr. Bradley, previous to his becoming our astronomer royal.

We have now explained the general principle of the refracting telescope, (as applied to astronomical purposes,) which, from its superior portability, has almost entirely superseded the use of the reflecting telescope, which was originally superior in that respect to the refractor; and as they are rapidly growing into disuse, we shall not enter upon an explanation of the principles of their construction, but proceed to lay before our readers some of those magnificent spectacles exhibited to our view by the fine instrument just described.

### THE TELESCOPIC APPEARANCES OF THE MOON.

When the earth is situated exactly between the sun and the moon, so that the former shall be setting in the west, when the latter is appearing in the east, then the moon is said to be full, because at that time the sun shining directly upon her disk, a full round orb is presented to our view. The unassisted eye can distinguish a number of irregular spots on her face, (or disk, as it is termed,) by their dark colour, from the brighter or more glaring parts; but by the aid of the telescope, the large dark shades are resolved into a number and variety of spots and lines, varying in form, lustre, and colour. The full moon, although a pleasing object to examine, falls far short in interest of the appearances of the same luminary when on the increase or decrease.

The annexed engraving represents the telescopic appearance of the full moon.



The varieties both of the forms and lustre of these appearances, are occasioned by the diversity and character of the mountains, the pits, and the seas or plains, which constitute the appearances themselves. It may be asked, How is it known that the surface of the moon is formed so analogous to that of our earth as to consist of mountains, &c.? This we will endeavour to make plain, recommending all who are possessed of a telescope, capable of magnifying at least forty times, to examine attentively the gradual increase of the illuminated portion of the moon's disk, for a few nights during the first or second quarter, and they will soon discover that there are real inequalities on her surface, which can be no other than mountains and valleys; for they will soon identify the shadows cast by the mountains to be in the exact proportion, as to length, which they ought to have according to the position of the sun with respect to the earth and the moon, from night to night: for instance, figure 1 of the cut below represents a small portion of the moon's disk with several of the mountains as they appear on a certain night, when the moon is in her first quarter, as seen through a telescope of high magnifying power; and figure 2 shows the same mountains on the next night; the moon, in the mean time, having

Fig. 1

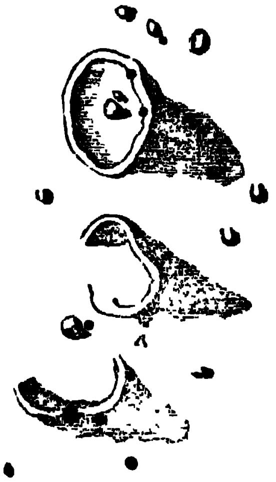
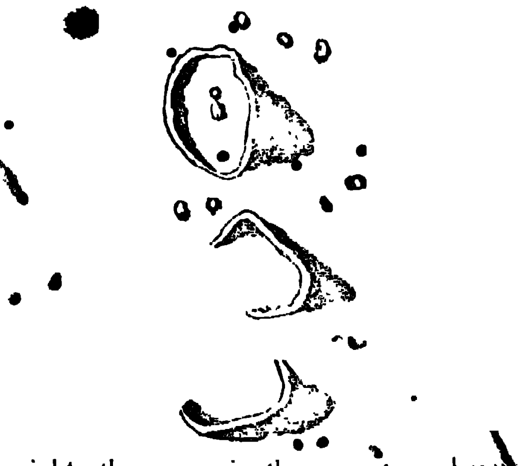
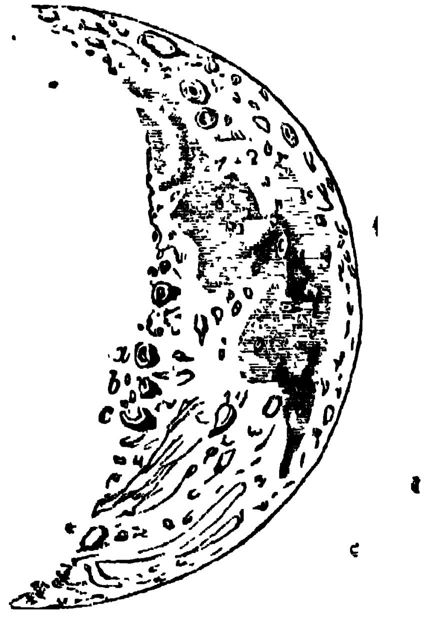


Fig. 2.



advanced towards the full, is getting more nearly opposite to the sun, and of course the shadows are diminished. At the full no shadows whatever are formed, and the mountains appear like very bright specks; but after the full, the shadows will again present themselves to view, but on opposite sides; that is, they will be thrown to the left, instead of being on the right, as shown in our cuts. The same objects are represented in our cut below, and marked *a*, *b*, *c*, denoting their position on the moon's surface.

The prodigious inequalities on the surface of the moon are thus clearly made out, by looking at her through a telescope at any other time than when she is full; for then there is no regular bounding line between the dark and illuminated parts, which, if the moon was a perfectly smooth sphere, would be a well-defined concave oval line; but, on the contrary, it is always observed to be extremely ragged, and indented with deep recesses, and prominent points. The mountains near this edge first appear as small points, or islands of light, beyond the extreme edge of the enlightened part, which are their tops catching the sunbeams before the intermediate plain, and which, as the light advances, at length connect themselves with it, and appear as projecting from the general edge, casting long black shadows, as they should evidently do, when we consider that the sun is in the act of rising or setting to the parts of the moon so circumstanced, and (as before remarked) when the sun gains altitude, or what is the same thing, the moon approaches the full: then the light falls upon the moon from behind us, or in our line of sight, and the shadows shorten and disappear, and after the full they appear in an opposite direction. The foregoing cut represents the moon as shown in a telescope magnifying about sixty times when not far from the quadrature.



The spots in the moon, of which there are many thousands, generally assume a circular or cup-shaped form, encompassing cavities, into which their shadows are thrown; but the larger of them have, for the most part, flat bottoms within, from which rises centrally a small steep conical hill. Now the only similar appearances on the surface of the earth are our mountains of volcanic character, as in the crater of Vesuvius; it is not too much, therefore, to conclude, that the lunar mountains may be of a volcanic nature. Besides, bright spots, supposed to be volcanoes, have been seen in the dark portion of the moon, emitting a light of such intensity as to illuminate the surrounding parts; and if the volcanic matter be thrown to nearly an equal distance around the crater, the circular form of the summits of the mountains may be accounted for. Near the edges of the moon, the spots assume an oval form, but this arises from their being foreshortened in appearance, being projected upon a sphere; the height of some of the mountains in question has been estimated at about two miles perpendicular.

The moon turns upon her axis in the same time that she performs her revolution round the earth; consequently the same face is always presented to our view, with a very trifling exception, which arises from what is termed her libration. If there be inhabitants in the moon, the earth must present to them the extraordinary appearance of a moon two degrees in diameter, or about four times the size the moon appears to us; and for the above reason, the earth can only be visible to the inhabitants of one half of the moon, being for ever veiled from the other. What would be said of a traveller who, returning from the southern hemisphere, was to tell us of the existence of such a moon illuminating the nights of the regions he had visited; and that we, in order to witness it, must travel half round the world? But such must be the case with the inhabitants of one half of the lunar globe.

## UMBRELLAS.

Umbrellas are of great antiquity; although they have scarcely been used in England sixty years. Among the Greeks the umbrella was a mark of elevated rank, and one is seen on the Hamilton vases, in the hands of a princess. We find it figured upon the ruins of Persepolis, the age of which is lost in antiquity. The Romans used it, especially at the theatre, to keep off the sun; for their playhouses had no roofs, and the performances were in the day-time. Notwithstanding this antiquity, Coryate, the old traveller, describes the umbrellas of Italy as rarities—"made of leather, something answerable to the form of a little canopy, and hooped in the inside with divers little wooden hoops, that extend the umbrella in a pretty large compass. They are used especially by horsemen, who carry them in their hands when they ride, fastening the end of the handle upon their thighs." These and other umbrellas only are described for keeping off the sun, a circumstance which may be explained by the comparative scarcity of rain in the countries wherein they were used. It might, however, have been expected that the frequency of rain in our island would have rendered the umbrella a very acceptable introduction from the continent. The reverse happened; and, a century and a half subsequent to Coryate's time, or about 1768, wh[illegible]llas were first used in England, t[illegible]e violently ridiculed by the vulgar. [illegible] first man who carried an umbrella in the streets of London was hooted for his folly; and few but the macaronis of the day, as the dandies were then called, would venture to display an umbrella, which was universally considered as a mark of effeminacy. About the same time coffee-houses were first established in the metropolis; and one of their earliest accommodations was, to keep a single umbrella, to be lent, as a coach or chair, in a heavy shower.

The "Female Tatler" advertises—"The young gentlemen, belonging to the Custom House, who, in fear of rain, borrowed the umbrella from Wills's coffee-house, shall the next time be welcome to the maid's pattens."

As late as in 1778, one John Macdonald, a footman, who has written his own life, informs us that when "he used a fine silk umbrella, which he had brought from Spain, the people called out, 'Frenchman! why don't you get a coach?' At this time, there were no umbrellas worn in London, except in noblemen's and gentlemen's houses, where there was a large one hung in the hall, to hold over a lady or gentleman if it rained, between the door and their carriage." Much of this clamour was raised by the hackney-coachmen and chairmen, who profited by an ill wind and rain, and who feared the umbrella would supersede the coach, or chair; but the coachmen had been similarly assailed by the watermen, upon the introduction of hackney-coaches; so manifold are the obstacles of self-interest to every step of public convenience. This footman, however, according to his own report, was a sensible man; for he adds, that he persisted in carrying his umbrella for three months, till the people took no further notice of the novelty. Foreigners began to use their umbrellas; then the English; and the making of umbrellas soon became a great trade in London. Their use has much increased of late years, and materially benefited our silk market: and we doubt whether a Frenchman carries his parapluie with greater regularity than an Englishman does his umbrella. The improved manufacture of umbrellas has had some share in this change; for those of the last century were short, unsightly things, and did not combine the advantages of shelter and a walking-stick.—*Domestic Life in England.*

The above is the account generally given as to the introduction of umbrellas, and Jonas Hanway is said to have been the first who commonly used one; but in Gay's poem, called "Trivia, or the Art of Walking the Streets," we find the following lines in the description of the effects of a shower of rain.—

"The tuck'd up sempstress treads with hasty strides,
While streams run down her oil'd umbrella's sides."

◆

## THE SEPARATE EXISTENCE OF THE MIND.

The strongest of all human arguments, both for the separate existence of the mind, and for its surviving the body, is drawn from the strictest induction of facts. The body is constantly undergoing change in all its parts. Probably no person at the age of twenty has one single particle in any part of his body which he had at the age of ten; and still less does any portion of the body he was born with continue to exist in or with him. All that he before had has now entered into new combinations, forming parts of other men, or of animals, or of vegetable or mineral substances. Yet the mind continues one and the same. None of us parts can be resolved; for it is one and single, and it remains unchanged by the changes of the body. The argument would be quite as strong though the change undergone by the body were admitted not to be so complete, and though some small portion of its harder parts were supposed to continue with us through life.

But observe how strong the inferences arising from these facts are, both to prove that the existence of the mind is entirely independent of the existence of the body, and to show the probability of its surviving! If the mind continues the same, while all or nearly all the body is changed, it follows that the existence of the mind depends not in the least degree upon the existence of the body; for it has already survived a total change of, or, in the common use of the words, an entire destruction of that body. But again, if the strongest argument advanced by those who would attempt to show that the mind perishes with the body, nay, the only argument being as it indubitably is, derived from the phenomena of death, the fact to which we have been referring affords an answer to this. For their assertion is, that we know of no instance in which the mind has ever been known to exist after the death of the body. Now, here is exactly the instance desiderated, it being manifest that the same process which takes place on the body more suddenly at death, is taking place more gradually, but as effectually in the result, during the whole of life; and that death itself does not more completely resolve the body into its elements, and form it into new combinations, than living fifteen or twenty years does destroy, by like resolution and combination, the self-same body. And yet after those years have elapsed, and the former body has been dissipated, and formed into new combinations, the mind remains the same as before, exercising the same memory and consciousness, and so preserving the same personal identity, as if the body had suffered no change at all.

The facts referred to prove that the soul does exist apart from one body with which it once was united; and though it is in union with another, yet as it is not adherent to the same, it is shown to have an existence separate from, and independent of, that body.

Here, then, we have that proof so much desiderated — the existence of the soul after the dissolution of the bodily frame with which it was connected. The two cases cannot, in any soundness of reasoning, be distinguished; and this argument, therefore, one of pure induction, derived partly from physical science, through the evidence of our senses, partly from psychological science, by the testimony of our consciousness, appears fully to prove the possible immortality of the soul.—*From Lord Brougham.*

### THE RESURRECTION OF THE BODY.

As the finding out the particulars of the dust of our bodies discovers the vastness of the knowledge of God; so to raise them will manifest the glory of his power as much as creation. Bodies that have mouldered away into multitudes of atoms, been resolved into the elements, passed through varieties of changes; been sometimes the matter to lodge the form of a plant, or been turned into the substance of a fish or fowl, or vapoured up into a cloud, and been part of that matter which hath compacted a thunderbolt; disposed of into places far distant, scattered by the [illegible] swallowed and concocted by beasts, [illegible] these to be called out from their [illegible]ent places of abode to meet in one body, and be restored to their former consistency in a marriage union, "in the twinkling of an eye," 1 Cor. xv. 52, is a consideration that may justly amaze us, and our shallow understandings are too feeble to comprehend it. But is it not credible, since all the disputes against it may be silenced by reflections on infinite power, which nothing can oppose, for which nothing can be esteemed too difficult to effect, which doth not imply a contradiction in itself?—*Charnock.*

### THE GOSPEL.

He that believeth the gospel with hearty love and liking, as the most excellent truth, will certainly with the like heartiness believe on Christ for his salvation, 1 Thess. i. 5, 9, 10.—*Marshal.*

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